

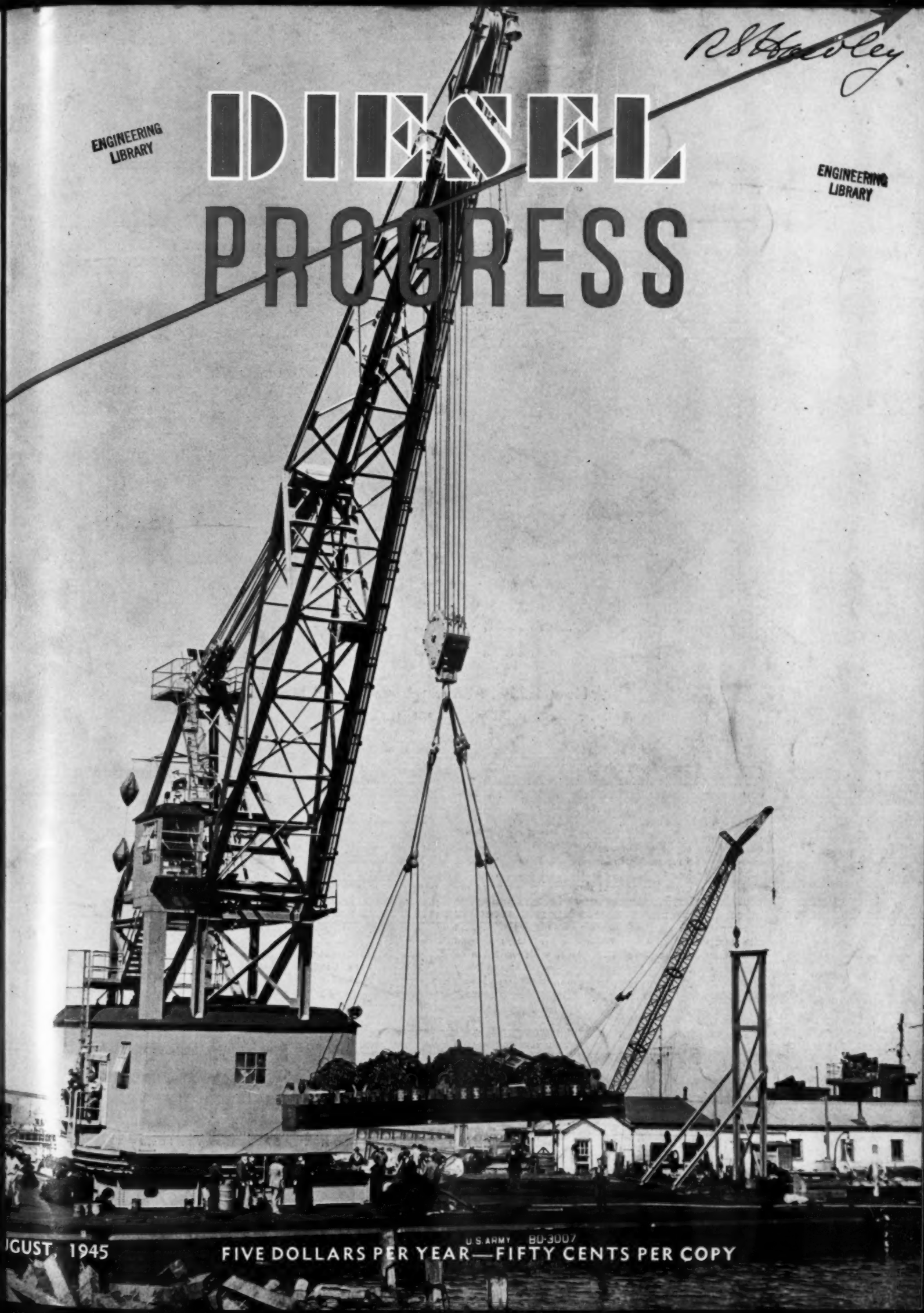
ENGINEERING
LIBRARY

DIESEL PROGRESS

R. S. Hawley

ENGINEERING
LIBRARY

... 90
... 49
... 106
... 131
... 128
... 125
... 13
... 46
... 131
... 131
... 126
... 22
... 110
... 105
... 130
... 88
... 100
... 7
... 82
... 34
... 91
... 11
... 130
... 94
... 21
... 99
... 129
... 112
... 126
... 131
... 26
... 124
... 45
... 132
... 30-31
... 121
... 128
... 129
... 130
... 89
... 43
... 123
... 129
... 130
... 129
... 85
... 87
... 107
... 96
... 129
... 37
... 131
d Cover
... 130
... 10
... 28
... 115
... 95
... 129
... 117
... 27
... 92
... 124
... 12
... 48
... 130
... 98
... 41



AUGUST, 1945

FIVE DOLLARS PER YEAR—FIFTY CENTS PER COPY

U.S. ARMY BD-3007

L. PROGRESS



PROVEN IN SERVICE

- ★ New Baldwin-Westinghouse Diesel Locomotive
- ★ Texaco Ursa Diesel lubricant

THIS new 2000-hp. Baldwin-Westinghouse Diesel-electric locomotive is designed for main line freight or passenger service. It can be used singly, or in combination with similar units to form a 4000-hp. or 6000-hp. locomotive.

Each unit contains two Baldwin-built, 4-cycle Diesel engines of eight cylinders each, developing rated power at 625 r.p.m. Cylinders have a $12\frac{3}{4}$ " bore and a $15\frac{1}{2}$ " stroke.

Test runs covering several thousand miles were recently completed in various types of service and under all conditions on the lines of leading railroads across the country. *Texaco lubricants were used exclusively.* At the completion of these runs, cylinders and pistons were found to be absolutely clean, with no trace of carbon deposits anywhere. Rings were completely free in their grooves. "We are more than pleased with the clean, effective lubrication afforded by Texaco,"

say Baldwin Locomotive Works officials.

Results like these indicate why Texaco Ursa Diesel lubricants are approved by leading Diesel builders.

There is a complete line of Texaco Ursa Diesel lubricants—one to meet the lubrication requirements of every type of Diesel. Texaco Ursa Diesel lubricants prevent scuffing, ring-sticking, sludge and corrosion, keep engines clean, increase the life of rings, pistons, liners and bearings. Because of these benefits—

More stationary Diesel hp. in the U. S. is lubricated with Texaco than with any other brand.

A Texaco Lubrication Engineer, specializing in Diesel lubrication, will gladly recommend the most suitable grade and type of Texaco Ursa Diesel lubricant for your engine. Get in touch with the nearest of more than 2300 Texaco distributing plants in the 48 States, or write: The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO Lubricants and Fuels

FOR ALL DIESEL ENGINES

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON EVERY SUNDAY NIGHT—CBS

DIESEL PROGRESS, for August, 1945. Volume XI, Number 8. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 2 West Forty-fifth St., New York 19, N. Y. Rex W. Wadman, President. Acceptance under the Act of June 5, 1943, at East Stroudsburg, Pa., authorized March 27, 1940. Subscription rates: \$5.00 per year, single copy, 50c.

Diesels
First-Ha
How T
Villisca
Another
New 56
Bulldoz
The Na
A Bit C
Supervi
Exchang
WPB R

FRONT
ing cran
Corpora
Diesels
generato

TABLE
scene a
Caterpi
Emsco

DIESEL
Publish
Street,
Subscrip
All othe
paid th

LOND
CHICA
Ave
CLEVE
Bld
DETRO
Tri
TULSA
LOS AN
Stre

REX W. WADMAN
Editor and Publisher

WILBUR W. YOUNG
Managing Editor

HEYWORTH CAMPBELL
Art Director

AUGUST CONTENTS

Diesels Logging Around The World	56
First-Hand View Of B&O Diesel Operation	57
How The B&O Trains Its Diesel Operators	64
Villisca, Iowa	66
Another Gas Engine At Dominguez	70
New 56' Diesel Auxiliary Yawl	74
Bulldozers Synonymous With Diesels	75
The Navy Likes California's Diesel Tuna Gillpers	78
A Bit Of The West's Tractor History	80
Supervising And Operating Engineers' Section	82
Exchange Your Diesel Maintenance Ideas Section ..	84
WPB Relaxes Controls On Diesel Industry	100

FRONT COVER ILLUSTRATION: This 60-ton floating crane, built for the Army by Wheeler Shipbuilding Corporation, is powered by Atlas main and auxiliary Diesels of 257 hp. and 10 hp., respectively, driving G-E generators.

TABLE OF CONTENTS ILLUSTRATION: Night scene at West Edmond Field, Oklahoma, showing two Caterpillar Diesels which operate 24 hours a day driving Emsco drill ring and Gardner-Denver mud pump.

DIESEL PROGRESS for August 1945, Vol. XI, No. 8. Published monthly by Diesel Engines, Inc., 2 West 45th Street, New York 19, N. Y. Tel. MUrray Hill 2-7333. Subscription rates are \$5.00 for U.S.A. and possessions. All other countries \$7.50 per year. Subscriptions may be paid the London office at £1-17s. per year.

BRANCH OFFICES

LONDON: S. W. 1, 10 Bury Street, St. James

CHICAGO 1: Willard R. Cotton, 307 N. Michigan Avenue, Franklin 2508

CLEVELAND 14: Frank J. Enright, Union Commerce Bldg., Main 5693

DETROIT 2: R. F. Pickrell, 314 Stephenson Bldg., Trinity 1-0790

TULSA 3: O. F. Cozier, 515 McBirney Bldg., 4-5555

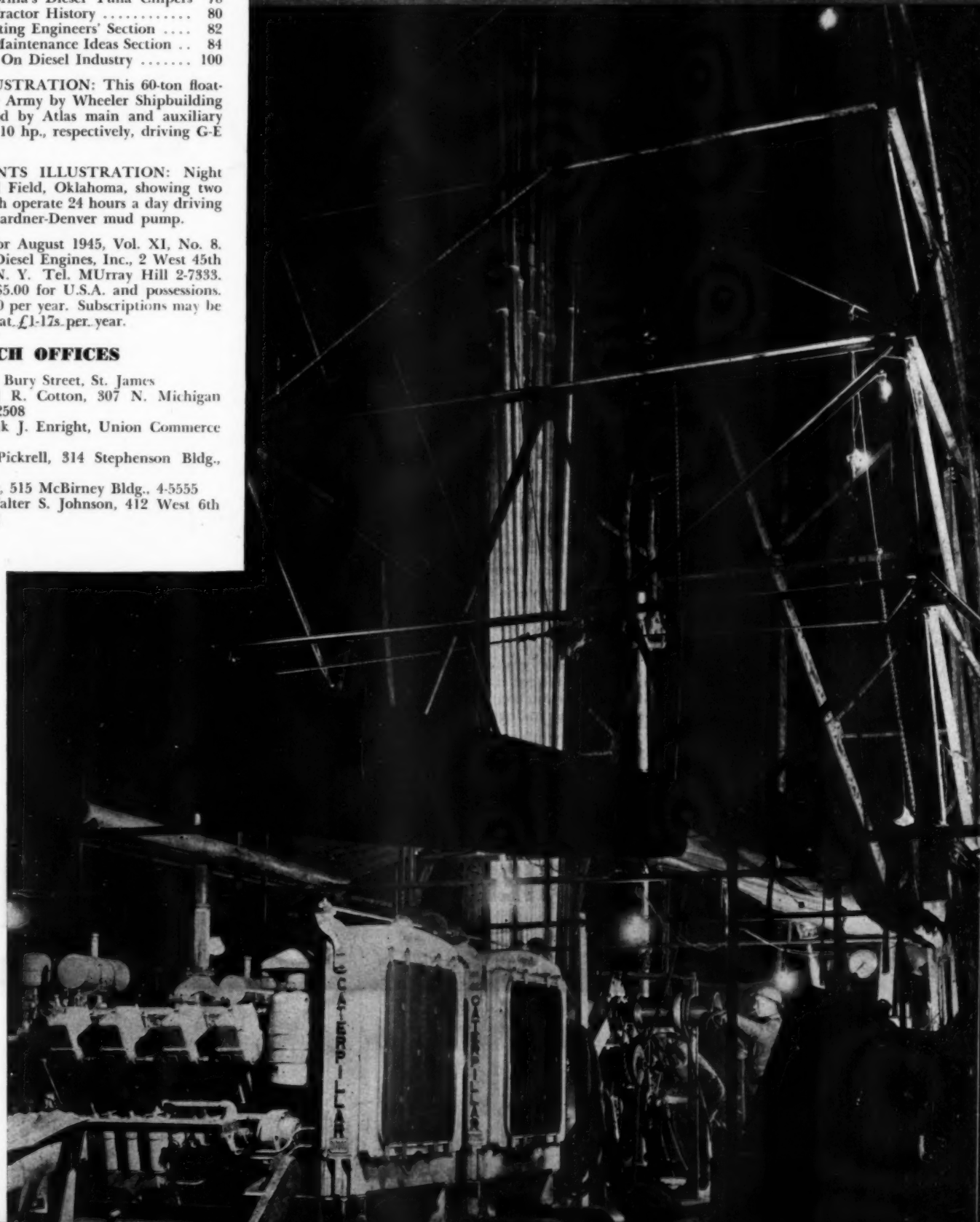
LOS ANGELES 14: Walter S. Johnson, 412 West 6th Street, Mutual 1391

DIESEL *and* GAS ENGINE PROGRESS.

NBP
ASSOCIATION

Member National Business Papers
Association and Controlled
Circulation Audit, Inc.

CCA





RECORD SMASH

Missouri Pacific's "Big Jeep" Smashed Load
and Speed Marks on Maiden Run . . . New Hauls
Record-Breaking Tonnage Day In, Day Out!

SPECTACULAR SUCCESS! Right at the start Missouri Pacific's new 5400-h.p. Diesel freight locomotives proceeded to set the railroad world talking . . . breaking all existing load and speed records of the road on the run between Texarkana, Arkansas and Dupo, Illinois.

What's more, it was found that the new time bettered by 8 hours the schedule for "symbol" oil trains, the hottest and fastest freight carried by any line. Think of it! Eight hours saved on a 515-mile haul!

To lubricate its new Diesels during this critical trial period, Missouri Pacific selected Shell Diesel Lubricants, first choice of thousands of operators everywhere.

That was more than a year ago!

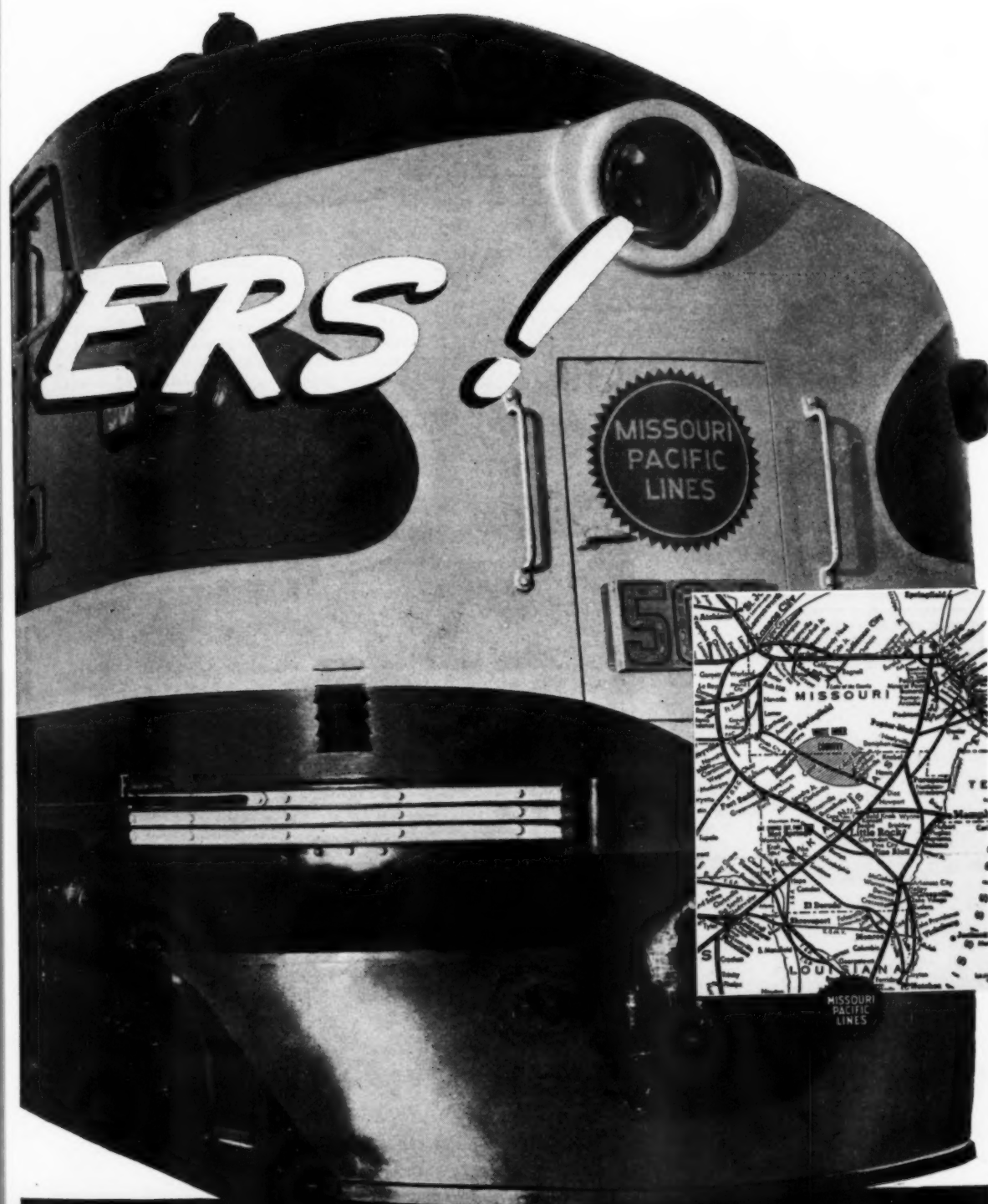
Today and every scheduled day since, these 4-unit 5400-h.p. Diesel locomotives have been operating as 3-unit 4050-h.p. locomotives . . . have been on the job hauling maximum-length trains of loaded cars.

Today and every day since, Shell Diesel Lubricants have been used; their performance carefully checked by Shell lubrication engineers working with Missouri Pacific engineers and maintenance men.

For further information, phone, wire or write Shell Oil Company, Inc., 50 West 50th Street, New York 20, New York, or 100 Bush Street, San Francisco 6, California.



SHELL



DIESEL LUBRICANTS



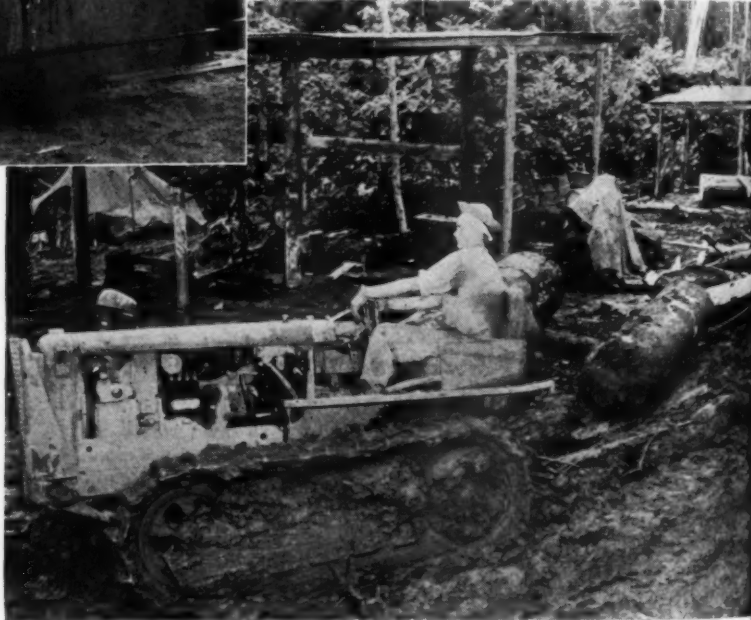
Loading piling for large construction job on truck with a Caterpillar Diesel tractor.



Above: The Furness tract in Worcester County, Maryland, produces 60 pilings a day. Left: This Caterpillar Diesel drives a sawmill producing 15,000 bd. ft. of lumber per day.



Caterpillar Diesel tractor handling logs around the sawmill.



Jumping to New Guinea we see a Caterpillar Diesel tractor hauling logs for bridge construction. Signal Corps photo.

DIESELS LOGGING AROUND THE WORLD

WITH a wartime nation demanding wood, and then more wood, logging operations continue at a merry clip. One very interesting logging operation finds "Caterpillar" Diesel tractors, equipped with Hyster winches, helping handle and load 60 pilings per day at a truck loading point on the Furness Tract in Worcester County, Maryland. The owner of these tractors is Paul M. Jones of Snow Hill, Maryland.

At a sawmill near Cambridge, Maryland, another Diesel "Cat" is used to skid logs to the mill, hauling a distance of $1\frac{1}{4}$ miles. The tractor works nine hours a day on less than a gallon of fuel per hour to feed the sawmill, which has been handling 12,000 feet per day. The owner is George G. Green of Cambridge. At the Showell Mfg. Co. mill at Showell, Maryland, three "Caterpillar" Diesel tractors are employed while a "Caterpillar" Diesel engine fur-

nishes the power to operate all the sawmill machinery. Some 15,000 board feet of lumber are handled daily.

At the same time, similar logging methods are used in war theaters throughout the world. For instance, a "Caterpillar" Diesel tractor over in New Guinea skids logs to a mill to provide lumber for building bridges on new military roads.

THE echoes of America's War of 1812 had scarcely died when the first beginnings of what is now the great Baltimore & Ohio Railroad system were laid. . . . A few weeks ago President Roy B. White issued the 118th Annual Report of the company wherein was revealed that in the year 1944 over 147 million tons of revenue freight were carried—2½ times the volume hauled in 1938 besides nearly 14½ million passengers, or four times that carried in 1939! Perhaps no other large railroad has, percentage-wise, felt the crushing impact of the war load that has descended on the B & O. In all its very long history, meeting emergencies and solving peculiar problems has been an outstanding characteristic of this great system, covering 11,000 miles of track in 13 States. The shipper, everywhere, thinks of the B & O as one of the world's greatest coal carriers. The passenger, everywhere, fondly remembers the friendliest personnel and cleanest passenger trains to be found on almost any system in North America. . . . Down in Baltimore, at headquarters, where everybody is polite and preserves a strange mannerism reminiscent of the calmer, more chivalrous days that have gone—and says "Ballimer" when speaking of their home town, you get the feel not of a railroad so smothered in tradition it cannot keep pace, but a live, smooth organization of gentlemen hell-bent on keeping the bustling old company right in the forefront on everything from gadgets in the passenger washrooms to the best lubricating oil or machine tools out in the ancient, but modernized, Mt. Clare General Shops. The company's very age keeps it rejuvenation-minded!

The B & O has used just about everything ever invented for motive power . . . every kind of steam, from ancient high-wheelers with low boiler pressure, on up through everything ever devised to pull cars, including Mallets, gasoline locomotives, a small, but very active fleet of the very first electric locomotives used in America, to haul trains through the Mt. Royal tunnel in Baltimore; the water tube and even welded steel boiler models of coal fired steam; oil burners and, as far back as 1925, bought a little 300 hp. Diesel switcher. That was 20 years ago.

Despite the fact that normally, almost 35 per cent of its total annual freight revenue came from hauling bituminous coal—in 1944 it rose to just under 61,000,000 tons of bituminous; 1,500,000 tons of anthracite and nearly 2,900,000 tons of coke—the B & O proudly claims the distinction of being the first railroad east of Chicago to boldly step out with mainline Diesel

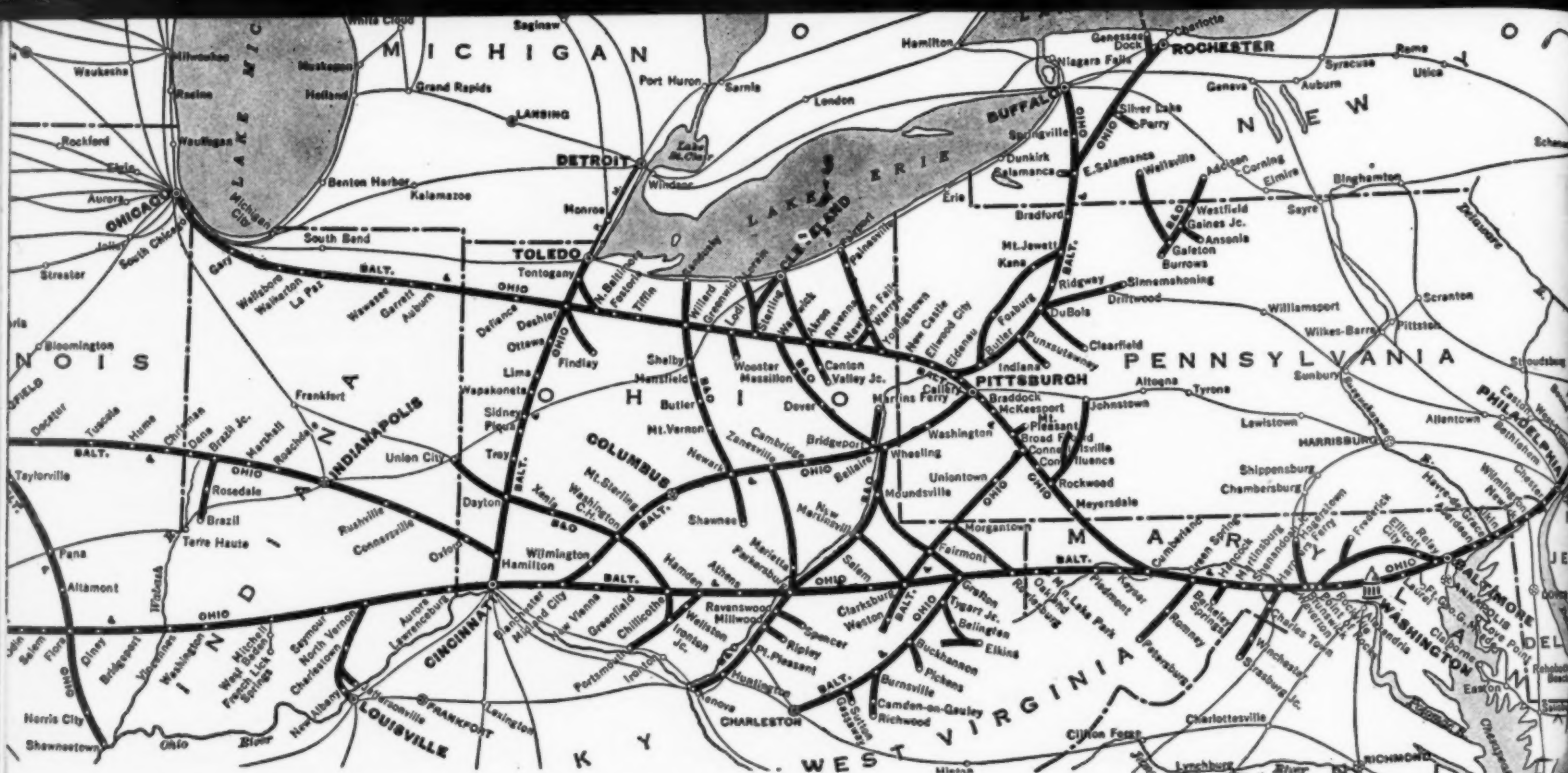
A B & O Diesel passenger locomotive getting quick service in Baltimore terminal.



BALTIMORE & OHIO

ROLLS UP RECORDS WITH DIESELS

By CHARLES F. A. MANN



The B & O system, of course, includes St. Louis, just off map on extreme left.

passenger power. Its fleet of thirteen 2-unit passenger Diesels has rolled up a most astounding mileage. But don't forget the B & O is wedded to coal, as almost no other railroad has ever been wedded to any single item of freight traffic!

The Baltimore & Ohio Railroad is the "front" for another of those peculiar railroad empires, which automatically makes it a laboratory for operating practices. . . . Through stock control, it is "head man" for the 1367 mile Reading Railroad, a \$175,000,000 company, that, in turn, controls the 657 mile Central of New Jersey, and likewise is half owner of the 393 mile Pennsylvania-Reading Seashore Lines. . . . Then, again, New Yorkers mustn't forget that the busy little Staten Island Rapid Transit Co., with its fleet of 95 electric cars, is a 100% B & O property, together with a lot of other rail, marine and bus facilities. Out in Chicago the entire terminal operation is a separate corporation doing a landoffice switching and terminal business. Until this year, the Alton Railroad, now going all-out for Diesel passenger operation, was a B & O affiliate.

When Passenger Diesel No. 51 was installed back in 1937 to haul the Capitol Limited or the Royal Blue, the Eastern Railroad Brethren snickered. . . . Wasn't steam and electricity good enough??? But this one 3,600 hp. Diesel, together with 12 similar units, the other 8 being 4,000 hp. locomotives with the 567 General Motors Diesel, have rolled up nearly 20,000,000 miles of operation since that time, seven of them not even being received until 1940-1941.

The ability to successfully dilute a fleet of nearly 2100 steam engines, nursed and operated with over 100 years of background in coal and steam, with a fleet now comprising 98 Diesel switchers, six 5,400 hp. General Motors Diesel freight locomotives and a total of fifteen 2-unit General Motors passenger Diesels, and turn up with some of the most remarkable records ever produced by any railroad using Diesels, is a milestone in the evolution of railroading from smoke, dirt, slow speeds and indifferent treatment of the public, to the postwar super railroad that can meet land and air competition on an equal footing.

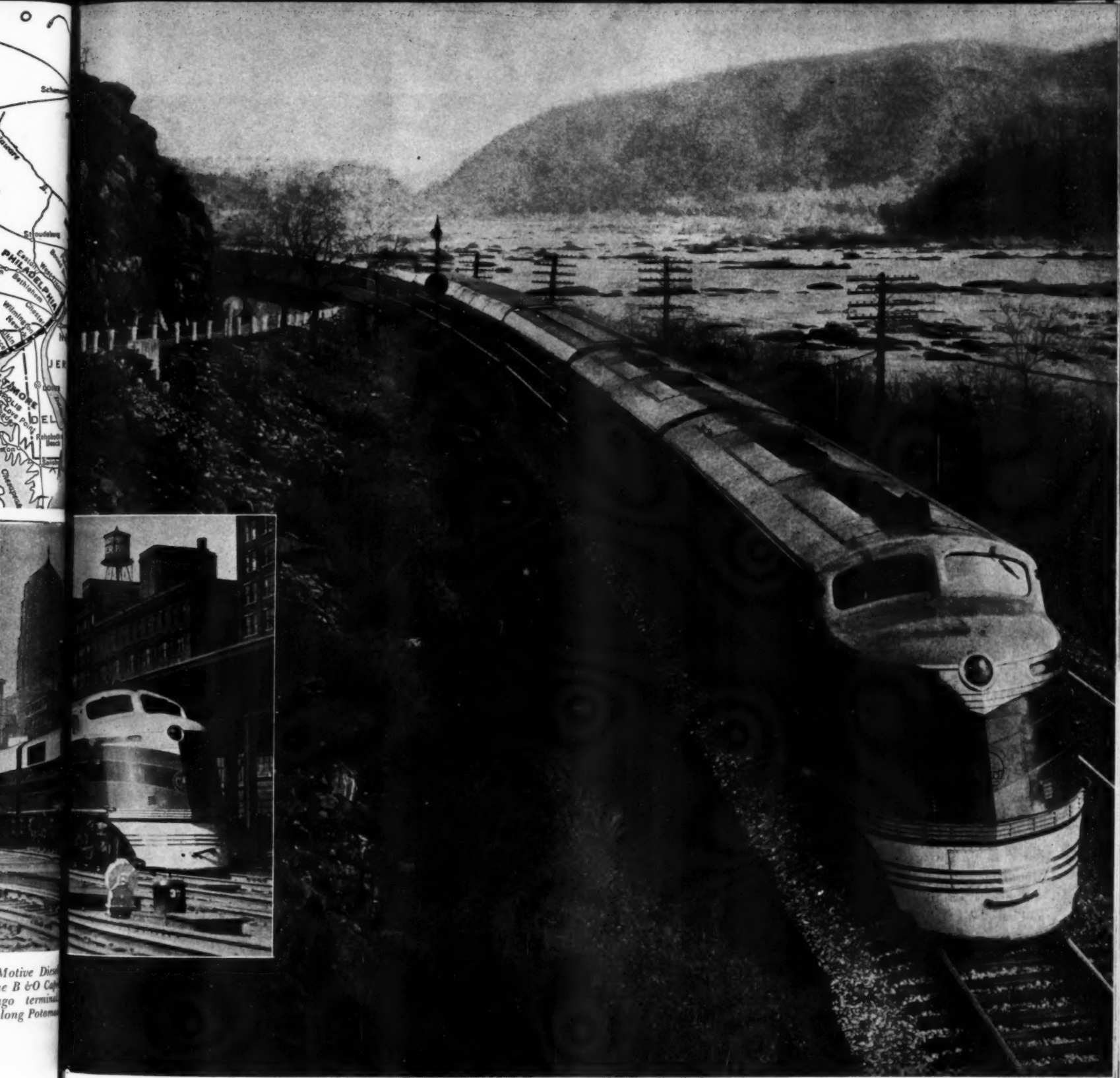
When it began pioneering with road Diesels, the writer of this article remembers a later comment by a prominent Diesel locomotive builder: "The B & O takes our lovely Diesels and pulls them apart and puts them together again just to see what makes them tick, whether they need repairs or not." That was back in 1940.

But it was the B & O's Yankee curiosity and thoroughness and ceaseless query, "What makes it tick"; the daring pioneering into land-flight trains (the Streamliners and the Zephyrs), by the Burlington and the Union Pacific; the wholesale, bold, mass-use of Diesel road power on a 'cost-be-damned' basis by the frantic, war-pressed Santa Fe and the cagey economic studies by the Great Northern that have paved the way for the 100% Diesel railroad. It is comforting to think that America's greatest coal-originating railroad helped pioneer Diesel road power . . . heaven help the Diesel if a coal railroad found anything wrong!



Above: A two-unit Electro-Motive Diesel electric locomotive pulling the B & O Capitol Limited out of Chicago terminal.
Right: The Capitol Limited along Potomac River below Harpers Ferry.

The B & O has carefully and thoroughly explored every angle of motive power. It speaks with authority when it points to a fleet of over 200 coal-fired Mallets and gives out with their economic applications in the coal territory. Nobody doubts but what this company will be one of the five or six large U. S. systems to ride steam clear out to its logical end. It will, therefore, not stop with acquisition of a larger fleet of Diesels for certain limited uses, and go the rest of the way with steam, but work out



Motive Diesel
e B & O Cap
go terminal
long Potomac

oughly ex-
It speaks
et of over
with their
territory.
ny will be
systems to
d. It will,
f a larger
es, and go
work out

all kinds and all makes of motive power, with plenty of rare experience records to thumb over in the files. This wonderful open-mindedness cannot be said to be the possession of certain other hide-bound Eastern trunklines, who deliberately throw mud at the Diesel and pray nights that a magician will suddenly make steam do the things it cannot.

This writer believes, after surveying Diesel and steam on some 17 of the nation's leading sys-

tems, that the Baltimore & Ohio offers a unique and continuing laboratory for Diesel, such as is possessed by almost no other railroad. Everywhere on all parts of this system, conditions are ideal for both types of power. Fuel oil from tankers is just as easy to obtain in Baltimore as it is near the end of Midwest pipelines in the vicinity of Chicago and St. Louis. Coal is a positive torrent on 7,000 miles of the 11,000 miles of tracks. Water supply is wonderful everywhere. Load characteristics

follow what might be termed the chart of America's economic blood pressure, for its tracks are the main arteries through the body of the nation, and have been since 1827. Crop failures in B & O territory are rare. Traffic characteristics cover everything from 100 trainloads of coal from one customer; a swift merchandise movement between New York and Chicago; the aristocratic drawing room A riders on the Capitol Limited and the country Cousin from the lowliest West Virginia village. Physi-

cally, the B & O offers everything from Western Plains speedways, hill and dale operation, meandering river-shore mainlines and mountain grades comparable with the Far West, not to mention Atlantic Coast fenced racetrackage between the large cities.

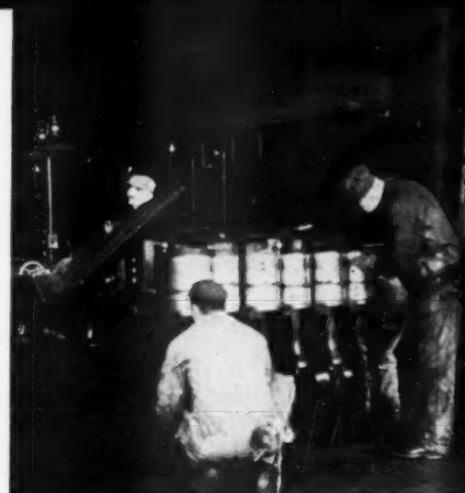
On such a railroad motive power can work out on merit alone and none may say that a particular type was chosen because of traffic conditions, weather, water purity, fuel situation, labor or anything else. As regards labor, the B & O is again clear in the top as far as likelihood of squabbles with unions, as it has carried Diesel maintainers on every one of its Mainline locomotives since No. 51 started to pull the Royal Blue and the Capitol Limited. This 3-man crew cost has all been digested in its operating results and the statistics do not speak with tongue in cheek, for if anything, they show maximum labor costs, rather than a fictitious minimum that may soon evaporate. In fact we doubt if any corporation in the U.S.A. has a more loving labor force than the loyal crew that makes up the B & O's mighty payroll. Many times Wall Street has had to admit the only thing that kept the B & O from being devoured by its two big Trunkline Competitors was its Labor Relations and Public Goodwill. People simply love the B & O and will go out of their way to patronize it. And work for it, too!

From just west of Baltimore, at Relay, Md., over the Old Main Line, or Mt. Airy Line, originally built as a through line from tide-water to Pittsburgh, the B & O is a regular Mountain Railroad, crossing the spurs of the Alleghenies via the Potomac River approach and down to the Ohio River headwaters, in true far-West fashion. Namely, they do have regular mountain grades. Climbing out of the Ohio River valley at Pittsburgh, up to New-castle and beyond, they get up on the wide Ohio-Indiana bench and it is a fast, level shoot to Chicago. The Mount Airy Line detours clear around Washington, D. C. and is a 13-mile cutoff, double tracked, for fast through freight operation, with but one passenger train a day to block the incessant procession of through freights from New York, Philadelphia and Baltimore, to Cumberland and West. Along this stretch, as far as Point of Rocks, Md., it is double track then, joining the line from Washington it is 4 fast tracks to Cumberland. There the line branches, one line going West over the last of the Alleghenies, to St. Louis, Cincinnati and Parkersburg. The other is the double track Chicago-Pittsburgh-Youngstown Akron-Cleveland "Main Line."

In 1937 when passenger Diesels boldly entered and beautifully "made" the new-day B & O passenger picture, the National Capital became the "Home Port" of the fleet of thirteen 2-unit General Motors Diesels. There are 5 major trains regularly operated, and by achieving 95% availability, this relatively small fleet of Diesels has rolled up an average of over 200,000 miles per month, some attaining in excess of 2200 miles in approximately 60 hours, with an average of 6 hours layover in Washington. Capitol Limited, National Limited, Diplomat, Ambassador and Shenandoah are the "Name" trains so operated. Two run Diesel all the way from Washington to Chicago; one to Detroit; and two to St. Louis. By the time this article is published, two and perhaps four more 4,000 hp. passenger units will have been added to this intensely operated Diesel passenger fleet, rated as one of the finest in the world.

As outlined above, because the B & O is so impressively and naturally a "coal railroad," the advent of even one freight Diesel is news. But the advent of not one but six is a milestone in Diesel progress. No high-pressure salesmanship did it. What with one of the nation's leading steam locomotive enterprises a prime source of traffic, the B & O went in for freight Diesels with eyes wide open. Besides high-pressure salesmanship on the B & O is only good for a lovely afternoon in polite conversation, topped off with a devastating Baltimore dinner, with refreshments!! A delightful but definitely unique brushoff!

Let's take a ride on the chief "Raison-D'Etre" of freight Diesels on the B & O. "New York 94," the crack multi-section merchandise freight that races time and competition. It becomes a Diesel operation at Willard, Ohio, at the beginning of hill and dale and mountain trackage. Willard, on the West; Philadelphia, the quickie turnaround point on the East, and Washington, Indiana, on the St. Louis Line, with Cumberland, in far Western Maryland the apex of this two-forked Diesel operation comprising the difficult heart of the whole railroad. Curves, stiff grades up and down, former use of excessive helper service and heavy traffic necessitating high average road speed, created a perfect spot for Diesels. War-time emergency movements of petroleum and materiel, finally in 1942-43 required, or rather opened up the exact logical spot for Diesel on the B & O. This fleet of 6 now averages 12,000 miles of running per locomotive per month, with an average net load of 5-6,000 tons. All the beautiful simplicity of electric braking down mountain grades works well.



Checking pistons and rings in Mt. Clare shops.



General Motors Diesel switchers handling trains in B & O Chicago terminal.

So we climb aboard locomotive D 3 at Connellsville, at the foot of the long climb to Sand Patch, on the summit of the Alleghenies. Our train has 111 cars and 5433 tons, and for the 57-mile climb a big steam helper—only one—is cut on at the rear. Not bad for a climb over 1% grade and considering our scheduled speed is well over 20 miles per hour for this heavy train. Leaving Connellsville at 11:55 p.m. we make the Summit in just over 2 hours and 45 minutes, then on to Garrett and to Cumberland in the early dawn. No double track line carries more trains than this section, which, together with light helpers working downhill, we clocked off a passing train (Westward) on an average of every 9 minutes for the whole night through! Two passenger trains overtook us. No place for slow freight here. Regenerative braking held the heavy train all the way downhill, and, as Engineer Rockwood beamed, "Boy what a difference bringing this baby down!" A layover in the schedule puts N. Y. 94 out of Cumberland about noon this time with 93 cars and 5900 tons. W. N. Foster, Road Foreman of Engines acted as pinch-hit-

Clare

dling
t.

Connells-
to Sand
es. Our
for the
y one-
mb over
d speed
s heavy
o.m. we
and 45
Cumber-
ck line
which,
ownhill,
ard) on
whole
vertook
genera-
he way
eamed,
babv
N. Y.
s time
Foster,
ch-hit-



A B & O fast freight (98 cars) handled by Electro-Motive 5400 hp. locomotive, seen in the Alleghenies near Hancock, Maryland.

it would require twice as many of the heaviest in the fleet, plus twice as many helpers, to make this type of a fast freight "move."

These six Diesels maintain a gruelling schedule that gives them but an average of 6 hours in 3 days in the shop. Willard, Ohio is 1216 miles from Philadelphia, and Diesels make the round trip once every three days. Arrival is about 9 a.m. and departure is around 3 p.m. at Willard. At Philadelphia, a quick turnaround point, only fuel, lube oil and sanding is given, then the Diesel starts right back. Servicing facilities for the freights are similarly located at Cumberland, Washington, Indiana and Philadelphia—all merely "Service Stations" while heavy repairs on a timed schedule covering a 100,000 mile operating cycle are divided between Willard and the big Mt. Clare general shops in Baltimore.

Before having a look-see at the unusual operating and maintenance system set up for the B & O road engines, a brief mention of the fast growing fleet of Diesel switchers is noteworthy. As of May 1, the company had a total of 98 Diesel switchers in service, concentrated heavily in four major points: Baltimore Terminals; Chicago Terminals; Philadelphia Termi-



G-M road switcher handling transfer movement on Chicago terminal railroad.

ting engineer, and soon we rolled along the Potomac River toward Brunswick. Here, after passing the junction from the St. Louis line, practically two trains were in sight all the time. The freights go the high, straight track and the passengers take the winding water grade. The train crew swears that this will be typical of the B & O of Tomorrow—4 fast, level tracks all the way. From Point of Rocks, we diverge and start climbing up the Mt. Airy Line. With no helper, this 93-car train rolls along over the lush Maryland countryside at about 18 miles per hour, to the 880 foot summit at Mt. Airy Tunnel. This is the scenic part of the B & O that the public has not seen for many

years, since Washington, D. C., became the key Eastern terminus for passenger operations on the System, instead of Baltimore. Going down the long grade, Engineer Sheckells who boarded at Brunswick, simply puts the dynamic brake over to the maximum position and lets the train roll down the long, gentle grade past historic Ellicott Mills and to the busy Mainline Junction at Relay, on Baltimore's outskirts. Right up to Mt. Camden Station entrance to Mt. Royal tunnel we roll, preparatory to hooking on a couple of electric locomotives to boost the train through the tunnel, and get it into Philadelphia by 11:30 p.m. and New York before breakfast. Under steam operation

d over a
ency of
job and
ne work.
ervisors,
he chart
s fixing
maround
dination
hanic, a
for each
ular se-
parts of
as their
Items
become
it next
em that
of proud
95 and
turning
nke in-
proved
Termi-
of their
ch 2000-
its in a
ylinders
or every
ed every
il added
ts taken
carbon,
nts. In
ine, in-
be de-
be oil.
ard on
ares are
traction
-dipped
250,000
0 miles.
rip and
0 miles.
icipated
500,000
0,000 to
val and
equence
ers are

washed every 15 days in winter and 30 days in summer. Heavy repairs to all running gear, paint jobs, etc. that require taking the locomotives apart are done at Mt. Clare, a unit removed from a locomotive at a time. Just how this system gives results may be gleaned from an operating period of 585 Locomotive Months (Passenger) wherein they turned out 11,530,686 miles of operation and averaged 95.4 per cent availability. Comparable service by 103 heavy passenger locomotives in a pool, averaged out but 8,364 miles per month as against almost 20,000 miles per month per Diesel locomotive. In other words one Diesel did the work of 2½ steam locomotives straight down the line!

Freight operation shows equally as well, the 3 on the Willard Philadelphia run turning out 93.7% availability during a 32 month period of operation, or 12,000 miles per month, a near-record monthly mileage figure for USA railroads operating this same class of 5400 hp. General Motors locomotive. At Mt. Clare Shops many novel gadgets have been devised to speed the overhaul and replacement program. Spare motors, generators, Diesel Engine Assemblies of the 900, 1000 and 1350 hp. Diesels, including a portable tester for measuring the horsepower rating at various throttle positions of the Diesel that is ready to go back into a locomotive. A special rack or carriage is provided so that when a complete Diesel assembly is hoisted out of a locomotive, the Diesel remains on this rack till taken down, repaired and put back together again and ready to go back into the locomotive. Not to mention special devices that clean oil systems; wash and bake filters; steam and vacuum clean the locomotive inside and out; a machine to hone cylinder liners, etc. Waste lube oil is run through Refinol equipment and eventually used for switcher locomotives that don't run so hot, and finally degraded to use in handcars, and other rail equipment.

Thus by original ideas; constant vigilance; scientific planning and a Paper Work System of records that simply make each Diesel and each mechanic speak for themselves and start the work in proper order—complete anticipation of repairs before needed, the B & O has succeeded in piling up a whole crateful of absolute world records in handling a relatively small fleet of Diesels right under the nose, so to speak, of the world's greatest coal mining, transporting, consuming, and originating Railroad—the B & O! Sometimes the Diesel industry wonders how they did it. But Availability and Monthly Mileage Figures and Per Mile Costs don't lie—here are a few:

THE BALTIMORE AND OHIO RAILROAD COMPANY												
Motive Power Department												
RECAPITULATION - COST OF MAINTENANCE AND OPERATION - DIESEL ROAD PASSENGER LOCOMOTIVES 51 to 63 INCLUSIVE												
MONTHLY AVERAGE	PERIOD	MILEAGE	MAINTENANCE		OPERATION		MAINTENANCE AND OPERATION		MILES RUN PER GALLON		COST PER GALLON (PURCHASE PRICE)	
			PERCENT AVAIL- ABILITY	COST PER MILE	COST PER MILE	COST PER MILE	FUEL OIL	LUB. OIL	FUEL OIL	LUB. OIL		
	1939	113297	96.8	.250	.342	.592	.393	15.63	.042	.42		
	1940	135546	96.7	.203	.335	.538	.389	15.99	.042	.39		
	1941	218952	95.0	.207	.379	.586	.346	18.66	.048	.37		
	1942	250828	95.1	.269	.457	.726	.319	15.65	.060	.37		
	1943	251004	95.2	.281	.494	.775	.307	15.55	.064	.38		
	1944											
1944	Jan.	260989	93.9	.262	.520	.782	.293	14.36	.063	.38		
	Feb.	249432	94.2	.270	.525	.795	.294	14.29	.063	.38		
	Mar.	257412	95.5	.346	.525	.871	.294	17.34	.064	.38		
	Apr.	258562	95.1	.388	.521	.909	.307	15.36	.063	.38		
	May	265350	99.2	.430	.500	.930	.314	24.71	.064	.38		
	June	252472	92.3	.406	.495	.901	.330	22.38	.065	.38		
	July								.063	.38		

THE BALTIMORE AND OHIO RAILROAD COMPANY											
Motive Power Department											
RECAPITULATION -- COST OF MAINTAINING AND OPERATION OF DIESEL FREIGHT LOCOMOTIVES											
MONTHLY AVERAGE	PERIOD	MILEAGE	PERCENT AVAIL- ABILITY	MAINTENANCE		OPERATION		MILES RUN		COST PER	
				COST PER MILE	COST PER MILE	AND OPERATION		PER GALLON		GALLON	
						GRAND TOTAL	COST PER MILE	FUEL OIL	LUB. FUEL OIL OIL	(PURCHASE PRICE)	LUB. OIL
1944	1942	*30338	94.6	\$.186	\$.747	\$ 28300	\$.933	.169	5.86	\$.063	\$.37
	1943	40477	90.5	.254	.813	43182	1.067	.162	6.06	.064	.38
	Jan.	56829	85.0	.395	.879	72445	1.274	.159	5.71	.063	.38
	Feb.	65147	98.8	.366	.895	82111	1.260	.157	5.34	.063	.38
	Mar.	71434	97.8	.274	.852	80447	1.126	.156	5.92	.064	.38
	Apr. -	70105	95.9	.347	.833	82733	1.180	.162	6.13	.063	.38
	May	69566	95.2	.264	.850	77519	1.114	.163	6.28	.064	.38
	June	69303	87.1	.350	.823	80171	1.173	.166	6.93	.065	.38
	* 4 Months										

* 4 Months

THE BALTIMORE AND OHIO RAILROAD COMPANY									
YARD OPERATIONS -- BALTIMORE TERMINAL									
MONTH		UTILIZATION		COST OF REPAIRS -- DIESEL					
AND	IN	TOTAL	SAVINGS DIESEL		CUMULATIVE SINCE				
YEAR	SERVICE		UNDER STEAM		SERVICE BEGAN				
					ACTUAL				
		PER	PER	CUMULATIVE	PER	PER			
		CENT	HOOR	SINCE	HOOR	HOOR			
		COST		AUGUST 1940					
Calendar Years	5 months 1940	90.7	287,974	4.89	2.24	131,826	2.24	.16	
	1941	90.2	992,921	5.03	2.16	558,565	2.18	.17	
	1942	93.7	1,147,349	5.59	2.17	1,003,039	2.17	.21	
	1943	95.0	1,191,142	5.73	2.16	1,453,240	2.17	.22	
1943	Jan.	94.0	99,781	5.71	2.05	1,038,883	2.17	.21	
	Feb.	92.8	92,931	5.96	1.80	1,066,958	2.16	.21	
	Mar.	96.4	101,162	5.64	2.25	1,107,323	2.16	.21	
	Apr.	96.2	98,346	5.68	2.21	1,145,602	2.16	.21	
	May	96.1	99,968	5.59	2.30	1,186,708	2.17	.21	
	June	94.5	95,058	5.59	2.30	1,225,810	2.17	.21	
	July	95.9	98,333	5.51	2.38	1,268,276	2.18	.21	
	Aug.	94.9	99,927	5.66	2.23	1,307,642	2.18	.21	
	Sept.	94.2	98,758	5.82	2.07	1,342,751	2.18	.22	
	Oct.	95.1	102,445	5.79	2.10	1,379,904	2.17	.22	
	Nov.	95.3	100,048	5.83	2.06	1,415,256	2.17	.22	
	Dec.	93.7	104,385	5.99	2.18	1,453,240	2.17	.22	
1944	Jan.	93.3	111,020	5.92	2.63	1,502,534	2.18	.22	
	Feb.	94.0	109,232	6.18	2.37	1,544,419	2.19	.22	
	Mar.	93.5	119,279	6.35	2.20	1,585,761	2.19	.22	
	Apr.	91.5	115,911	6.52	2.03	1,621,881	2.18	.23	
	May	92.5	117,311	5.97	2.58	1,672,539	2.19	.23	
	June	94.0	117,806	5.94	2.61	1,724,285	2.21	.23	
	July	91.8	129,354	6.11	2.44	1,775,920	2.21	.23	
	Aug.	92.9	155,820	3.32	2.23	1,830,907	2.21	.23	

The B & O reaches an elevation of over 2600 ft. between Weaver-
ton and Grafton, with stiff grades near Altamont and Terra Alta.



Instructor F. R. Rykoskey, left, and G. F. Wiles, B & O Supervisor of Diesel Operations, with a class.

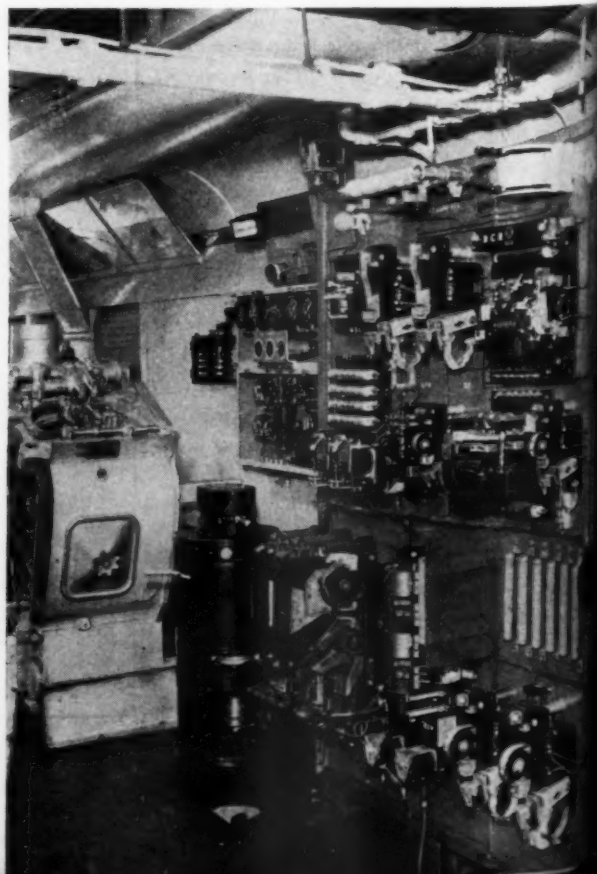


Interior of

Instructor Rykoskey explaining how an Electro-Motive Model 567 Diesel works.



Cutaway view of Control Panels on Electro-Motive Diesel locomotive, with model of a Controller.

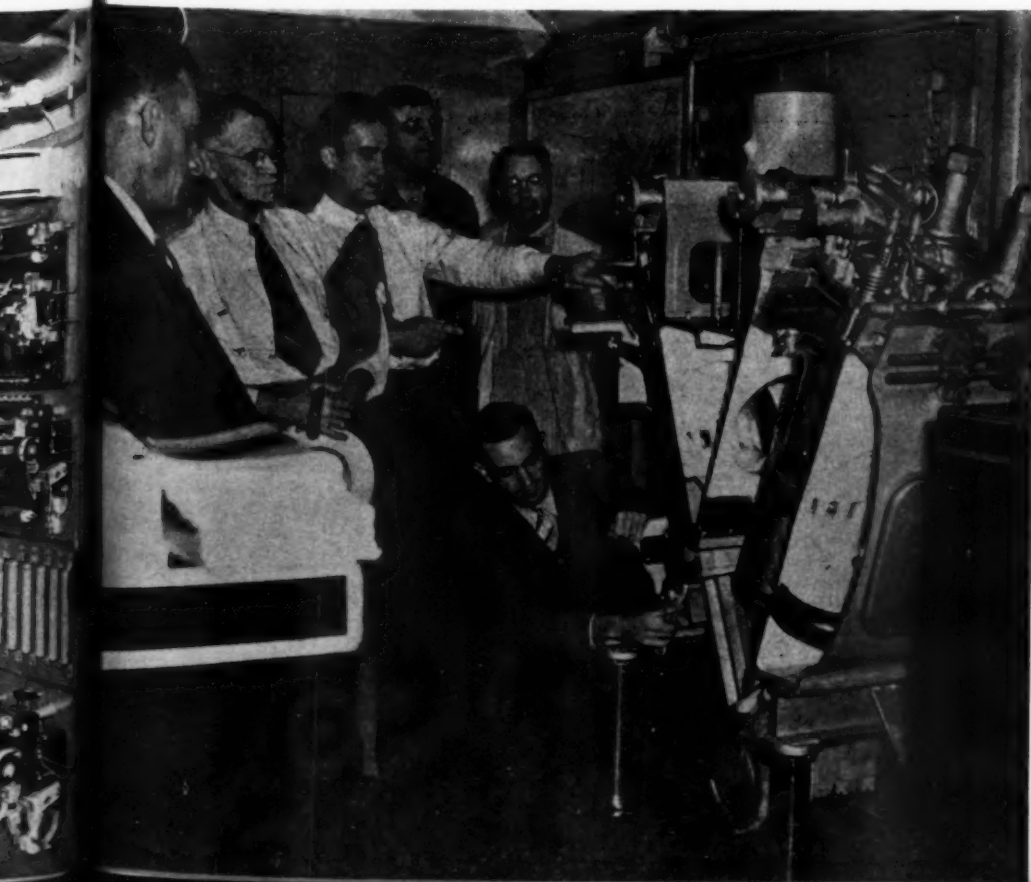




Interior of Diesel Instruction Car showing cutaway models, heating boilers, etc. . . .

otive Diesel
ler.

The class concentrates on details of the Electro-Motive Diesel.



Exterior of Diesel Instruction Car.

HOW THE BALTIMORE & OHIO TRAINS ITS DIESEL OPERATORS

By CHARLES F. A. MANN

EARLY in 1942 the Mechanical Department of the Baltimore & Ohio requested permission from the management to outfit a complete Diesel Instruction Car, to cope with the rapidly growing demand for training of personnel along the System for operating Diesel locomotives. In March of that year the company authorized full outfitting of such a car, together with appointment of an instructor, believed to be the first complete car of its kind on any U. S. railroad.

Cutaway models of the General Motors EM Division's 201-A and 567 Diesel Railway units were obtained; complete Electromotive and Westinghouse high and low voltage panels and contactor layouts, both for freight and passenger and also switchers. Also a full installation of controllers and throttle levers. A complete Vapor Car Heating Company's Type CFK heating boiler, identical with those used on Passenger Diesels; a full scale Main Engine Control Panel and various full-size reproductions of models and parts used in Diesel locomotive operation.

The car also has facilities for generating electric current and will seat a class of 20 railway people, and is complete with blackboard, lantern slide projector; 16 mm. movie projector etc. Instruction is divided into 8 complete lectures, with F. B. Rikoskey in charge, working under C. F. Wiles, B & O's Supervisor of Diesel Locomotive operation. As high as 12,000 man-lectures were given in one 90-day period.

DIESELS PAY PLANE

EXPERIENCE of Villisca, Iowa, with a municipally-owned Diesel generating plant illustrates that a community may not know what it can do until it tries. Villisca is one of many communities that have been surprised to find, after putting in Diesel plants, that the plant earnings enabled them to pay for the cost many years before the expected date.

This little city of 2,100 in southwestern Iowa—"Pretty place," according to its reputedly Indian-inspired name—installed a municipal power plant in 1936 with a financing plan that would clear off the plant debt along about 1960. It now finds that the debt will be wiped out in 1948. It is twelve years ahead of schedule. It will have done the job in half the time.

Take a look at the record. Of a total bond obligation of \$214,500 against the plant, the town had paid \$120,000 by March 31, 1945, the end of its fiscal year. It expected to pay the remainder in three years. It had paid \$22,500 to retire callable bonds before maturities; had called all such bonds every year as their terms permitted. Besides, it had paid from plant earnings about \$20,000 for additions to the distribution system.

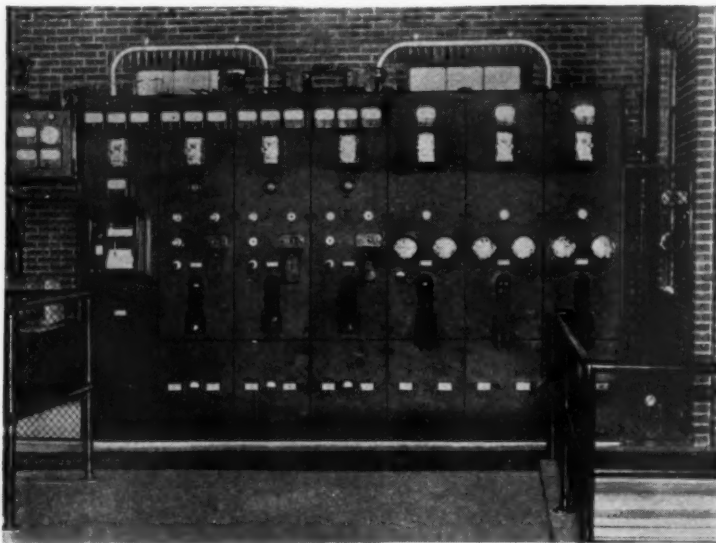
The total investment in the plant, including site, buildings, generating units and other equipment, and distribution system stands at \$252,104, without depreciation. Last year's operation left a surplus of \$8,269.

After years of service by high-transmission line, the city set up its own generating plant. To start with, it installed two Fairbanks Morse Diesel engines, each of 450 hp., 6 cylinders, with F-M alternators and auxiliaries. Consumer demands led to addition of a third Diesel, also a Fairbanks-Morse unit, in 1939, this one of 875 hp., 5 cylinders, with F-M alternator. The plant authorities were building for future needs, confident that the new total of 1,775 hp. and 1,206 kw. capacity would be ample for years to come and would obviate that common bugaboo—insufficient standby. The peak load of the plant in the year 1944-1945 was 650 kw. The plant load factor was 22.6 per cent. The standby 450 kw.

Figures on kilowatt-hour production in certain key years prove the performance of the engines. The years are the first full fiscal year of plant operation, the first fiscal year after installation of the large unit and the latest fiscal year. For 1937-1938, the kwh volume was 1,089,175; for 1940-1941 it was 1,691,800; for 1944-1945, 2,563,881.

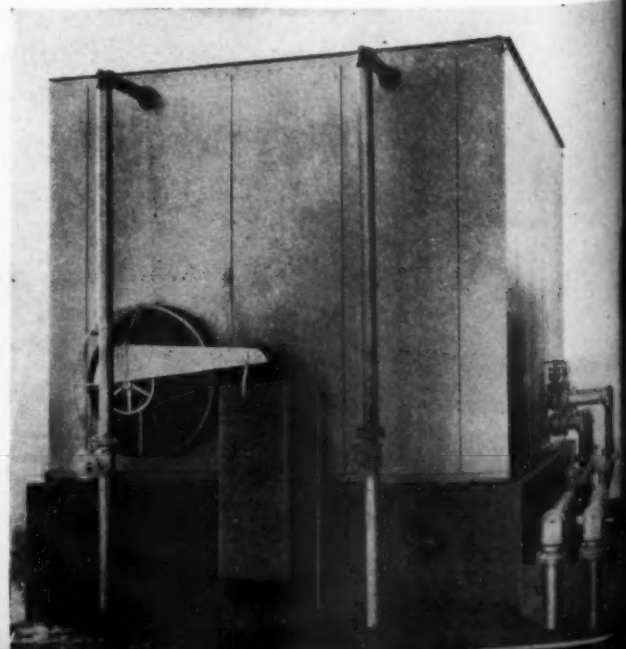


The Villisca, Iowa, power plant is a modern, well-kept Property.



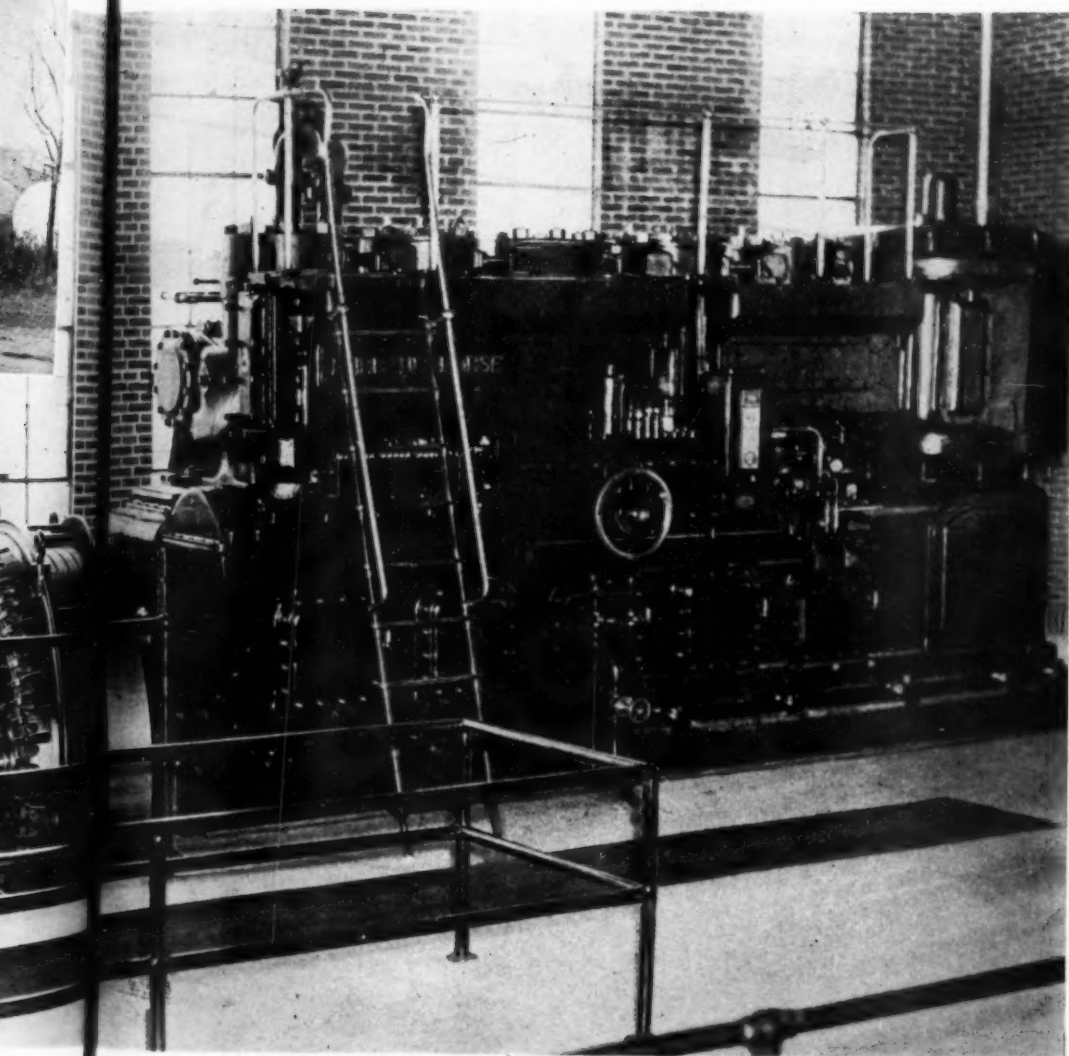
The switchboard is fitted with Westinghouse instruments and Ward Leonard electronic voltage regulators.

Two cooling towers serve the plant—a Diesel Service all-steel unit seen here, and a Marley wood tower, the corner of which shows extreme right.



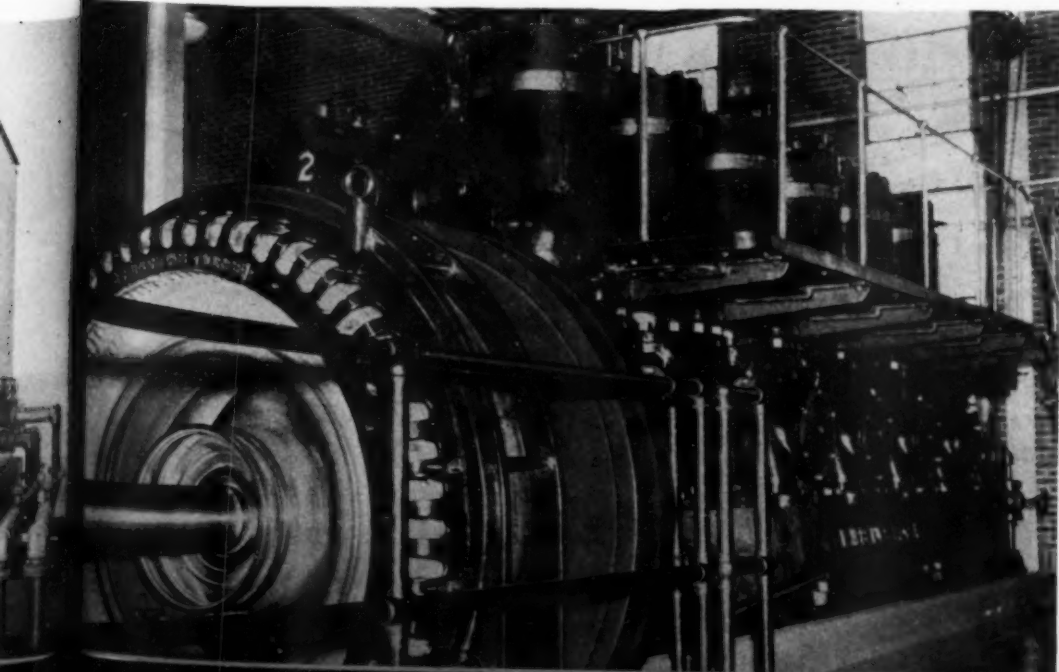
PLANT IN JIG TIME

By T. J. MALONE



Latest F-M Diesel to be installed is this 5 cylinder, 875 hp. unit with F-M alternator.

One of two, 6-cylinder 450 hp. F-M Diesels and alternators originally installed.



Generation in 1944-1945 was at the rate of 11.31 kilowatt-hours to a gallon of fuel oil; in 1943-1944 it was 11.44 to the gallon.

The largest users of power are five or six local industries, the village of Stanton, nine miles away, which is served by a high line built and owned by the Villisca plant, and a rural electric cooperative of about 600 members. The industries are an ice plant, a creamery, two hatcheries, a feed mill and a grain elevator. A railroad pumping station also uses considerable power.

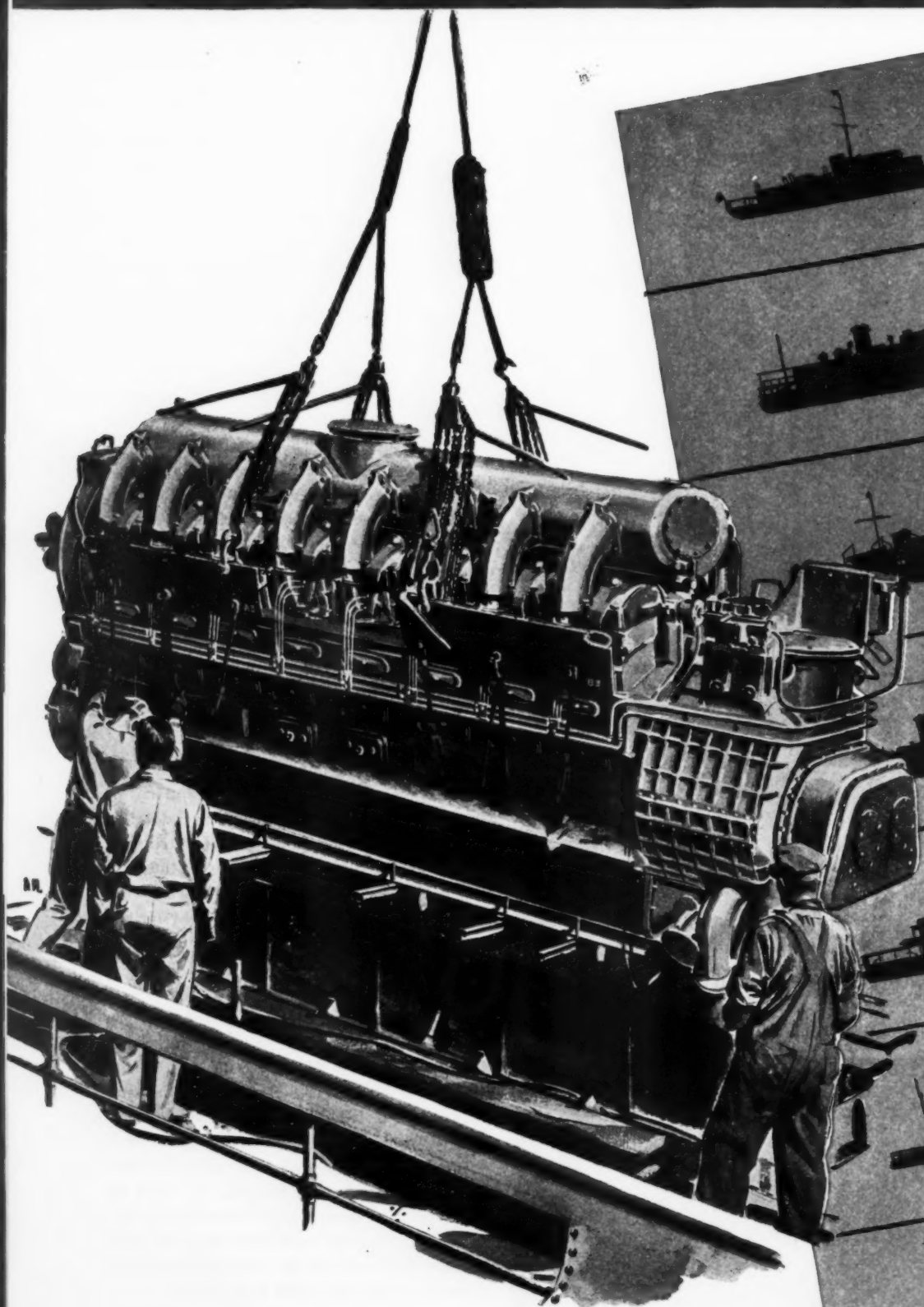
Stanton's 650 people consume about 10 per cent of the output of the Villisca plant. Stanton built its distribution system and owns it, free of debt. The REA "co-op" uses about 25 per cent of Villisca's production. Thus these two customers together take a little more than one-third of the "muny" plant's yearly volume. Any free services? Virtually none, said C. G. Hilleary, superintendent of the plant from its beginning and secretary of its governing board. However, there are minor contributions of power and personnel service at times, as for ornamental lighting and lighting for special occasions such as school activities sponsored by the local Chamber of Commerce. All regular services are billed. The general city tax has a levy for street lighting. This is all part of the board's policy—to center on paying off the plant debt and conserving funds for that purpose.

Villisca has made only one change in the rate schedule to consumers since the plant started, and that in 1938. Before the change, domestic rates were \$1.00 for the first 8 kwh.; 8 cents per kwh. for the next 17; 5 cents for the next 25; and 2¾ cents for all over the first 50 kwh. By the change, 2½ cents is charged for the next 100 kwh. over an initial 50, and 2 cents for all excess.

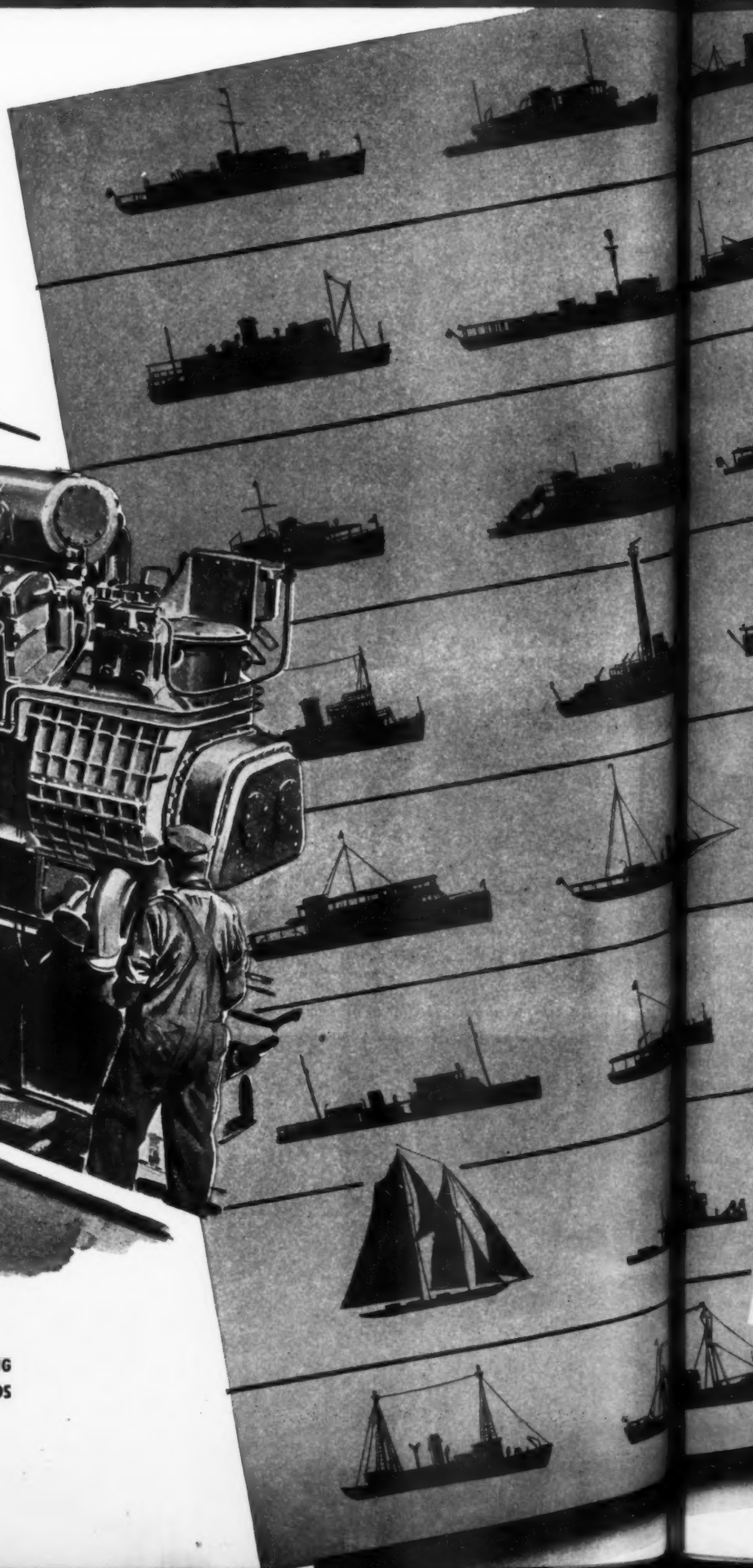
Power rates started out at: 5 cents for the first 200 kwh.; 3½ cents for the next 800 kwh.; 3 cents for the next 1,000 kwh. and 2½ cents for the next 1,000. These rates remain the same today. But reductions have been made on larger consumption. Thus the original power rates ran: for 2,000 kwh. after an initial 3,000, 2 cents; for the next 2,000 kwh., 1½ cents; for excess, 1¼ cents. These three have been changed thus: for 3,500 kwh. after an initial 3,000, 1½ cents; for the next 3,500 kwh., 1¼ cents; for all over 10,000 kwh., 1 cent.

Total operating expense for the fiscal year ended March 31 last was \$30,741.67. Gross revenue was \$60,760.19.

We are now ready to servou



KEEP AMERICA STRONG
BUY MORE WAR BONDS



your peacetime customers

CLEVELAND DIESEL ENGINE DIVISION
GENERAL MOTORS CORPORATION
2160 WEST 106th STREET
CLEVELAND, OHIO

To Boatowners Everywhere:

We believe it is now time to tell all of our friends in the marine industry that we are ready to figure on meeting their peacetime needs.

Numerous vessels used in the war effort, particularly yachts, towboats, ferry boats and cargo vessels of various types, are being returned to private ownership. Many of these vessels require reconditioning, including overhauling and possibly rearranging of the power plants.

If you are an old customer of ours, or if you have recently come into ownership of a vessel powered by Winton or General Motors engines, please be assured that the men who built the engines installed in your boat are now ready and able to put your propulsion and auxiliary equipment in first-class condition. No matter how small or extensive your requirements may be, we shall be glad to have you call on us for any service that we can render. Our policy of rendering prompt and efficient service will continue to insure smooth, dependable engine performance to users of our equipment.

We also are prepared to discuss new or conversion installations with naval architects, shipbuilders and vessel owners.

J.W. Roddrington



ENGINES...150 to 2000 H.P. CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, OHIO



Newest Worthington 400 hp. gas engine is seen, foreground, with Electric Machinery generator, Vortox air filter and Pickering governor.

DOMINGUEZ GETS FOURTH GAS ENGINE

By JIM MEDFORD

EMPHASIZING their faith in the dependability and economy of the natural gas-burning engine, approximately three and a half years after their first installation, the Dominguez Water Corporation have now its fourth Worthington gas-electric generating unit in service for a total of 1,600 bhp., marking the completion of the change-over from dependence upon any other type of prime mover.

Serving a portion of Los Angeles county, California, from 1911 until 1925 the plant was steam-driven. Then outside power was added, this dual power serving until January 24, 1941, when purchased electric energy was discon-

tinued, the load being taken over by three Worthington natural gas-burning engines with a total brake horsepower of 1,200. The steam generators were painted up and put into standby status for use only at peak seasonal loads. The addition of the three gas units doubled the plant's capacity. The fourth unit brings the Dominguez station up to possible 17,500,000 gallons of water per 24 hours.

Stemming from the need to keep pace with the steadily growing demand for more water because of the increased industrial development and irrigation requirements, the Dominguez Water Corporation's plant is second to none

both in appearance and efficiency—the first to be seen to be appreciated; the second attested to by a consistent 85% lagging power factor which is an indication of correct loading conditions of all motors.

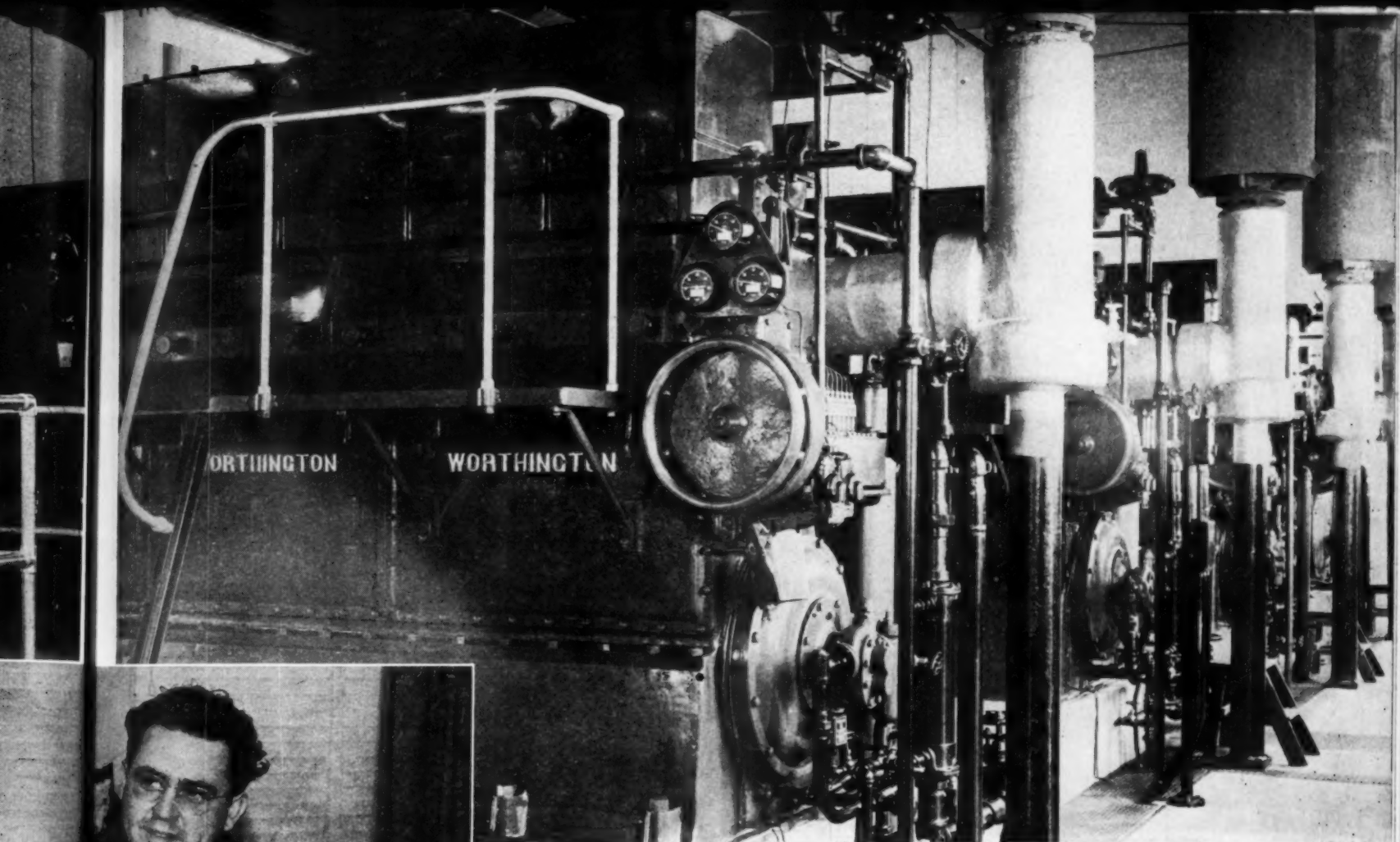
Located on one of the original Old Spanish Land Grants acquired by the Dominguez family prior to 1790, its present 20,000 acres is the site of one of the most extensive producing oil fields in Southern California. In addition, the rancho produces multiple tons of vital orchard and garden crops. Within and adjacent to its borders many extensive oil refineries are located, all demanding enormous quantities of



T. V. Talch

water
guez

Situa
water
tion
the c
teen
and
until
Wor
servi
grou
tion
engi



Operating ends of the four Worthington gas engines. All are fitted with Manzel lubricators and Maxim exhaust silencers.



T. V. Tallon, general plant manager and chief mechanical engineer.

output moved upward, this favorable percentage moved upward too, reaching an average of 75% where it has remained to date.

The installation of the fourth gas engine completes the modernization of the Dominguez water station begun thirty-four years ago and carried on under the direction of Water Superintendent "Judge" E. P. Tallon. Since the passing of Judge Tallon two years ago, the plant and its 75 miles of distribution system has been in the personal charge of T. V. Tallon, son of Judge Tallon and chief mechanical engineer, as general plant manager in addition to having charge of the mechanical department and charge of the water district operation and development.

Identical units, the four Worthington engines are six cylinder, 12¼ in. bore, 14½ in. stroke, connected to 50 cycle, three phase, 480 volt, Electric Machinery alternating current generators. Exciters are individual for each generator, of the package type, and multiple V-belt driven from sheave on engine-generator shaft, and are mounted atop the generator housing for compactness. Outboard bearings are pro-

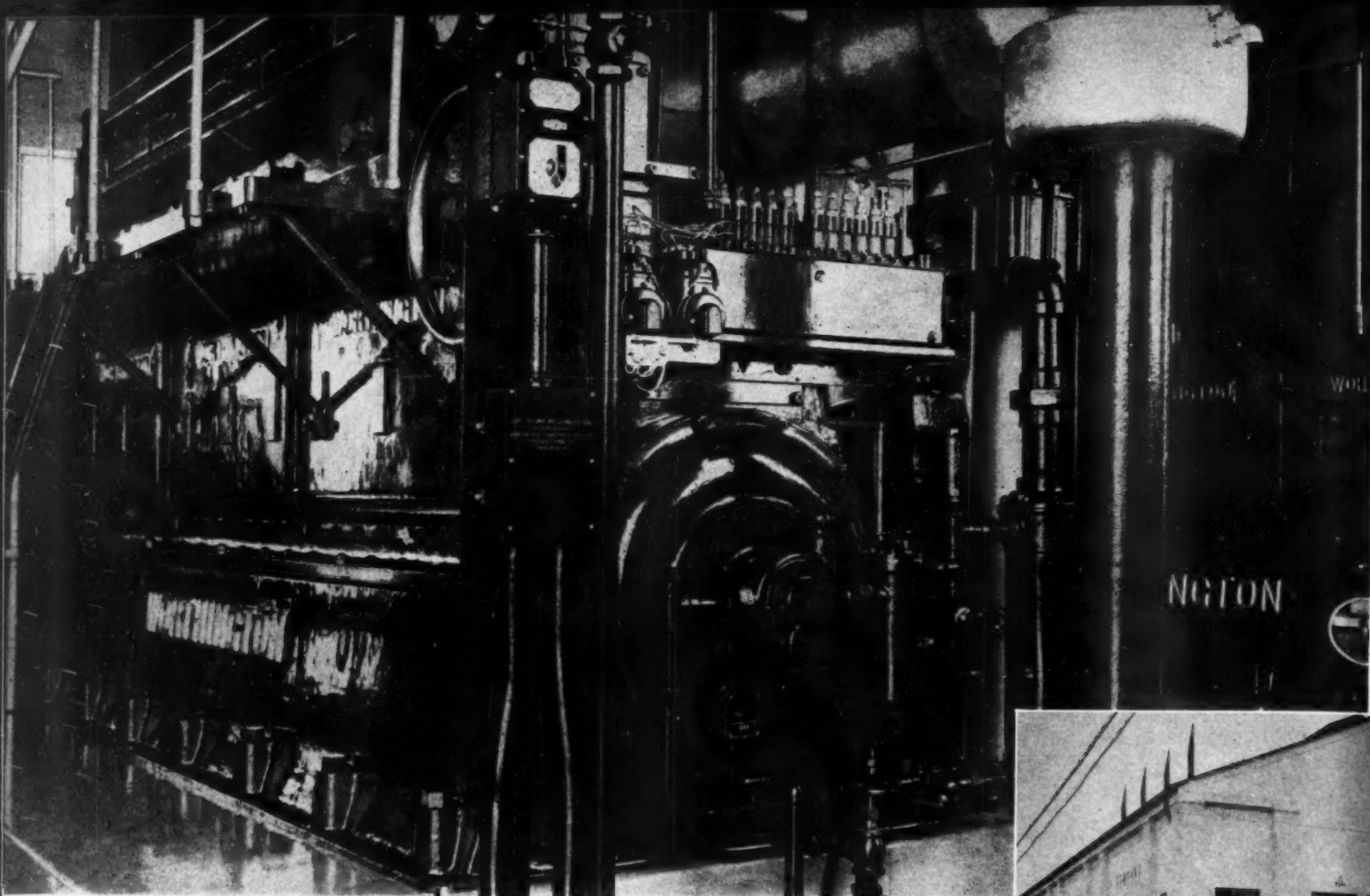
vided for shaft extensions, the 400 bhp. is delivered at 428 rpm., and each unit is fitted with Pickering hydraulic governors and individual E-M synchrosopes.

Developed for efficient combustion, the engine gas mixing valve is of the throttling type with separately adjustable valves controlling air and gas. The air valves have a double conical seat and the gas valve a single conical seat. The gas valve is operated by lever and linkage actuated by the governor, the linkage being adjustable for proportioning mixture. Ignition is dual with magnetos driven from camshaft. In each cylinder head are located two spark plugs, one wired to each magneto, assuring positive ignition.

Engine starting air is supplied by a gasoline engine- and motor-driven two-stage compressor. The air is stored in two steel flasks on concrete foundations outside of building. Dual oil filters of different types and of continuous operation are located in the engine lines with heat exchanger, guaranteeing clean lube at proper temperature. After 500 hours of operation the dirty oil is passed through thermostatic con-

water that are only available from the Dominguez system.

Situated near the City of Compton, Dominguez water has supplied industrial, oil field, irrigation and domestic demands since 1911 when the original steam plant was constructed. Fourteen years later electrical equipment was added, and this dual arrangement served the district until January 24, 1941, when the three 400 hp. Worthington gas-burning engines went into service pushing the steam plant into the background as standby power. Six months of operation showed a comparison in favor of the gas engine of 64%. As demand grew and water



Closeup of control end of No. 2 engine showing Brown pyrometer, Bendix-Scintilla magneto, Luberfiner and Cuno oil filters.

trolled purifier and returned to engine crankcase.

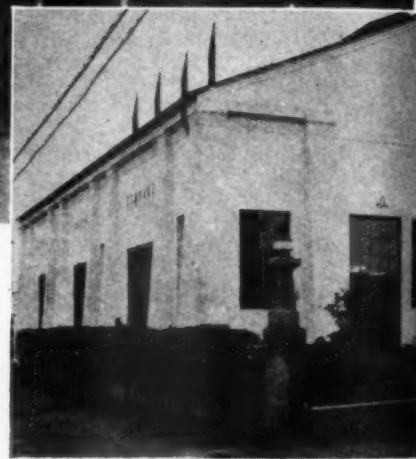
The cooling system is unusual in that the heat exchangers are installed in the rifle that connects the main settling basin with the reservoir from which distribution is made. Because of this all additional pumping of cooling water is eliminated and heat is wasted from circulating water with the utmost efficiency and economy. Individual cooling water pumps on each engine maintain circulation; pressure gauges are mounted on all suction and discharge ends. Safety controls are provided for each engine and low lube oil pressure and high water temperature alarm is led to horn on main switchboard where an indicator displays number drop for engine in trouble. Exhaust pyrometer with 24 thermocouples is mounted on standard at control end of No. 2 engine.

Centrally located, the main switchboard is of the dead front, enclosed cabinet type. Starting at the left, the first three panels contain Vacu-Break switches that distribute the output of the plant to the various pump motors and other loads. The fourth panel provides space for additional switches with bus ready installed.

Next is the central control panel with a governor control station, a wattmeter, and a switch that operates through an automatic synchronizing relay to connect the generator to the bus for each unit. Space is provided for expansion of the board. In addition there is a recording wattmeter that measures the total output, a recording voltmeter, and an individual ammeter, voltmeter, frequency meter and power factor meter.

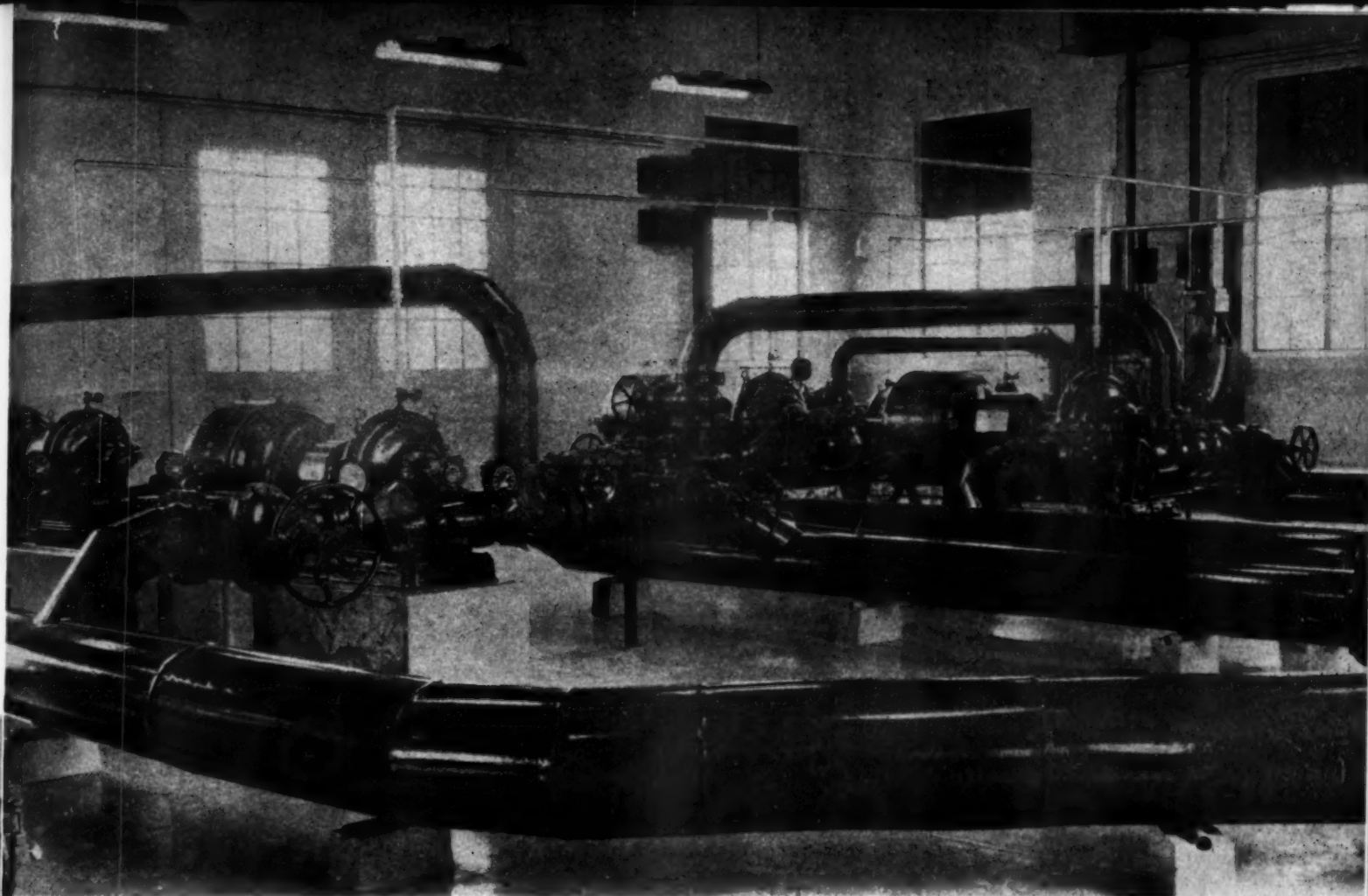
Mechanical maintenance economy has been developed under Fred Evans, in charge of preventive and maintenance measures. Keep it clean is a *must*. And machinery and plant premises are kept spotless. Daily checks are made of all operating equipment, including power and auxiliary units, switchboard and its instruments, cooling water system, etc. Monthly, the main bearings are cleaned and inspected, generator and exciter brushes are checked, governors lubricated, crank bearings checked, and electrical system given a minute inspection throughout.

As a result the average annual maintenance job per engine is a valve grind; a set of rings, \$180; half a set of main bearings, \$280; (in case of



The Dominguez plant building is modern and neatly kept.

Close-up of E-M generator, exciter and Syncroscope.



General view of the pumping equipment.

one defective bearing, all on that side are renewed to provide correct shaft alignment) one week's labor for mechanic and two helpers. \$156; total, \$616. At times, labor costs are some higher because time is not considered too much when making overhaul. When making overhauls all engine parts are carefully cleaned and carefully inspected. Any questionable parts are immediately renewed.

Excessive water demands have placed heavy loads on all engines causing certain gains in maintenance costs not usually found in plants of this size. For instance, during May, June and July, 1944, the overload on generator capacity was 10-15 per cent. Even with this increased water production, storage supply was dropping at the rate of over 100,000 gallons per hour. At times engines were operating on practically no vacuum at all, or an inch at most. The engines and generators are tops in Mr. Tallon's estimation: "They've been wonderful, have yet to hear of their equal." That the generators have been hitting the 85% lagging power factor right along bears out the Chief's remarks.

Annual output for the year 1943, 4,258,900

kw., but in 1944 this moved up to 5,758,385 kw., an increase of $1\frac{1}{2}$ million kw. The cost at the switchboard was three mills using as fuel gas rated 1120 Btu. This figure is all-inclusive except for depreciation.

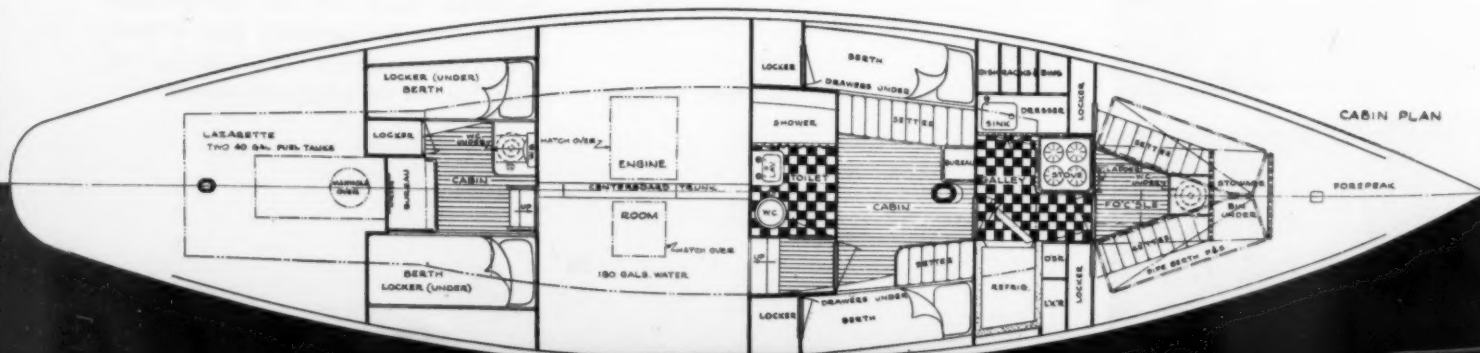
The 1943 sales of water was 337,185,300 cu. ft.—domestic, 7%; irrigation, 42%; industrial, 51%. For 1944: 411,547,600 cu. ft.—domestic, 7.7%; irrigation, 28.1%; industrial, 64.2%. This represents 90-94% of water pumped, a figure that is exceptionally high, the extreme figure of 10% loss being unusually low for so extensive a pipeline delivery. All steel pipelines are insulated with concrete outside layers wire-wound and grounded for electrolysis prevention because of the numerous electric railway lines traversing the rancho.

Mr. Tallon stresses the economy and efficiency of the plant being due to the loyal support of all members of the organization and to the excellence of Worthington and Electric Machinery Company's engines and generators, also Worthington pumps and other high-type equipment, making this gas-electric plant a leader in West Coast stations of its type and class. No engine has ever had a forced shutdown.

DECK PLAN

The Wheeler 56 not only combines complete comfort on deck and below, but does so in a manner that enhances the graceful lines that

She is unusually fast, both under sail and under power. Her engine is not tucked aft under the cockpit but is located alongside the centerboard trunk under the deckhouse, where it enjoys far more freedom and a sound foundation. Here it is not only highly accessible through large hatches, but ample provision has been made for ventilation. This engine location, furthermore, permits of placing the propeller well down, and also allows for the installation of larger-than-ordinary engines.



AUGUST

BULLDOZERS:

DIESELS

POOSH 'EM UP!

By F. HAL HIGGINS

EVER hear of a tractor, especially a Diesel tractor? Of course not if you know only about this mechanized war from what gets into the newspapers, magazines, newsreels, and on the air via radio. The Big Town boys got as far as that word "Bulldozer" when they went out to the war front and they couldn't absorb any more. So Bulldozer covers everything, often when the tractor is not even wearing one on its nose.

Well, believe it or not, the bulldozer is only an attachment on the nose of a tractor in this war, just as it was on the highway and dam construction, in the woods and in brush clearing before this war broke. This bulldozer was not a weapon yet in World War I, though the crawler tractor that carries and pushes it via its reliable Diesel engine was a big revolution in land warfare in World War I. The British engineers were quite open and frank in their praise of the Holt Caterpillar tractor in furnishing the ideas for their tank that finally broke the Hindenburg line and ended the stalemated trench war in 1918.

Where did the bulldozer come from? Who, where and how did it get onto the nose of these big Allis-Chalmers, Caterpillar, Cletrac and International Diesel tractors wherever U. S. Army, Marine, Sea Bee, Navy and Air Borne forces appear in this war? That's a question that several are beginning to try to answer now with greater or less accuracy.

Frank A. Nikirk, Stanford Civil Engineering grad of over 40 years ago, now with Thew Shovel, and with years of early railroad engineering in between, starts the bulldozer with the old "Mormon board." It was out on the ends of pairs of shafts in dirt moving on the western railroads. The pioneer railroad construction men worked lots of oxen power, which gave the word "bulls" to everything touching them—"bull skinner," "bull whacker," etc. Just as mule power gave us "mule skin-

ner," which was followed by "Cat skinner," "Cat doctor" and "Cats" when the Caterpillar tractors went into the woods and dirt moving fields. Knowing Nikirk very well for several years when he was with the Caterpillar Company as a Government and Contractor contact engineer for that concern when it was getting into many new fields requiring a lot of research, the writer rates his knowledge and research on the word tops to date. In his paper before the twelfth National Asphalt Conference he covered this question of the origin of the bulldozer as noted above.

Caterpillar's western and eastern factory headquarters have two different views on the origin of the bulldozer. One old ex-Holt employee, who has spent a lifetime on research in patents and knows research as well as anyone in this field is Wickersham. He says the word comes from the old frontier American "Bully," who shoved every local man around and challenging any new man to test his fighting ability. "I was born in western Iowa," said Wickersham, "father coming up from Tennessee in early post-Civil War days. He was quite a man himself and participated in many of these best-man bare knuckle combats in the frontier villages of the day where he lived. I think the word and idea came out of the South. Bulldoze came from this local bully athletically shoving other lesser men around. 'You can't bulldoze me,' of course, was the answer of some who refused to take this bullying." Webster's dic-

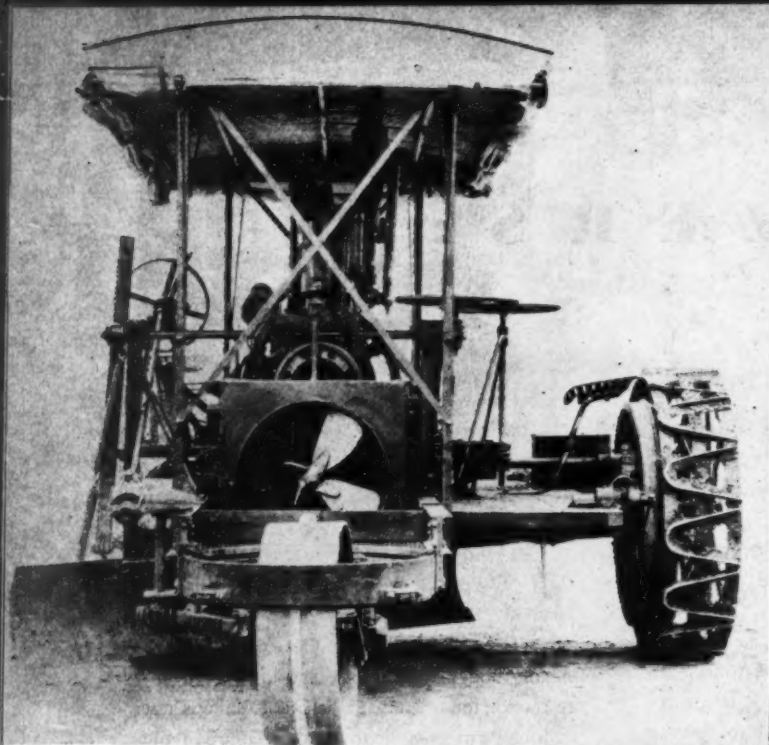
tionary seems to back up Wickersham in this line of thought. However, the attachment to the tractor today known as a bulldozer was not yet important enough to be noticed when the dictionary laid down this definition that covered the word as applying to the bully of school or community.

The main Caterpillar office from its publicity department has recently released a sketch of an early Russell bulldozer as advertised by this root concern of present day Caterpillar Tractor Co. This release dates the start of the Caterpillar bulldozer in 1917. However, the younger generation seems to have forgotten the old Holt branch that started the Caterpillar over at Stockton in 1905. While most of the living Holt men of that day are no longer on the Cat payroll, there can still be found two retired sales and service men from the Stockton factory who recall Holt put a bulldozer on a steam wheeled tractor in 1903 or '04. It was merely a wooden plank with no cutting edges, bolted onto the front of a Holt tractor. Dan Gilmore, star salesman for Holt in 1918 and in the office back to the turn of the century, recalls the first such effort when a vacant lot adjacent to the Holt plant was being leveled by pushing tin cans and other dump material into ditches and holes to get the lot ready for an addition to the factory. The wheels of the tractor got shoved around considerably as the weight of the piles of debris were encountered, he recalls, and not a great deal of work could be done



"Western Bulldozer" as cataloged by Western Wheeled Scraper Co. about 1880. Used extensively in early railroad construction, the "Dozer" was actually pushed by horses or oxen.





Another step in the evolution of the Bulldozer is seen in this combination wheel and track tractor with Holt blade underneath, built about 1905.

The first modern Diesel tractor-propelled bulldozers were most effective in snow removal; scene in Cascade, Idaho.



Here is a bulldozer mounted on an Austin-Western road patrol. These Diesel engine units are popular with road contractors.



U. S. Marines use a lot of bulldozers wherever they land. This is a Baker bulldozer mounted on Allis-Chalmers tractor powered with General Motors Diesel.

with the wheel tractors pushing such material.

It wasn't impressive enough for excitement, a picture for the advertising department, or further research at that time with possible future sales. Bill Figgins, who worked for Holt and Caterpillar for over 40 years in service and factory, recalls one he built onto the front of a Holt Cat about 1910. "The city of Stockton had been flooded that winter and the streets were covered with mud," recalls Bill. "I built this plank onto the front of the tractor to shove the mud off the streets and get them clean again."

Best's service engineers, headed by Fred Lewis, now with Harris Manufacturing Co. in Stockton as head of the Research Engineering Department, really started the bulldozer on its way to its first useful work in 1921. Fred Lewis built an attachment to help him sell a Best tractor to the City of Milwaukee. Out in South Milwaukee where that city dumped its garbage, there were ravines and canyons to fill and Fred conceived the idea that the tractor could do this by shoving the loose material over the edges to fill up the ditches and holes. Lewis then handed the plans for this first bulldozer on a Best tractor to LaPlant Choate and told that firm of what he had done and asked them to be ready to fill any such future orders that came along. Snow removal was another field that the new attachment began getting into with big heavy crawler tractors behind the attachment to shove the snow to one side. It had a side-casting effect that got snow off the roads and streets in a hurry.

That big Ex-Oregonian and ex-Californian with the French name—Bob LeTourneau—was the man who really made a revolutionary tool out of the bulldozer, according to Bob Mann, formerly with Holt and now Fred Grimsley's Office Manager at Stockton. "Bob used to come into the office here in Stockton with his troubles that came from trying to overload and overwork his tracktype tractors. He was abusing the tractors something awful by hitching his bigger dirt-moving carts behind them and trying to butt down walls and trees with his bulldozers. "Listen, Bob, why can't you be satisfied to work around some of these immovable objects instead of trying to go straight through a wall or a flock of trees?" I asked. "No tractor is built for that kind of work. If you are going to use the tractors to butt down walls and root out trees, you will have to build a special tractor for the job," I told him.

But the ever rising see-saw battle between tractors and equipment for heavy duty work in road and dam building, logging and farming was on. As fast as a bigger and better tractor appeared, the load would be increased till tractor was again overloaded. LeTourneau was way out in front, but every competitor was trying to catch up, so they kept stepping up their equipment to try to match his. In the woods, the bulldozer was terrific, especially after the Diesels appeared in 1932 to revolutionize that field. Labor was giving trouble and truck logging was coming in behind the bulldozer that carved out logging roads for them to operate over. Logging was always a game with he-men operators giving equipment

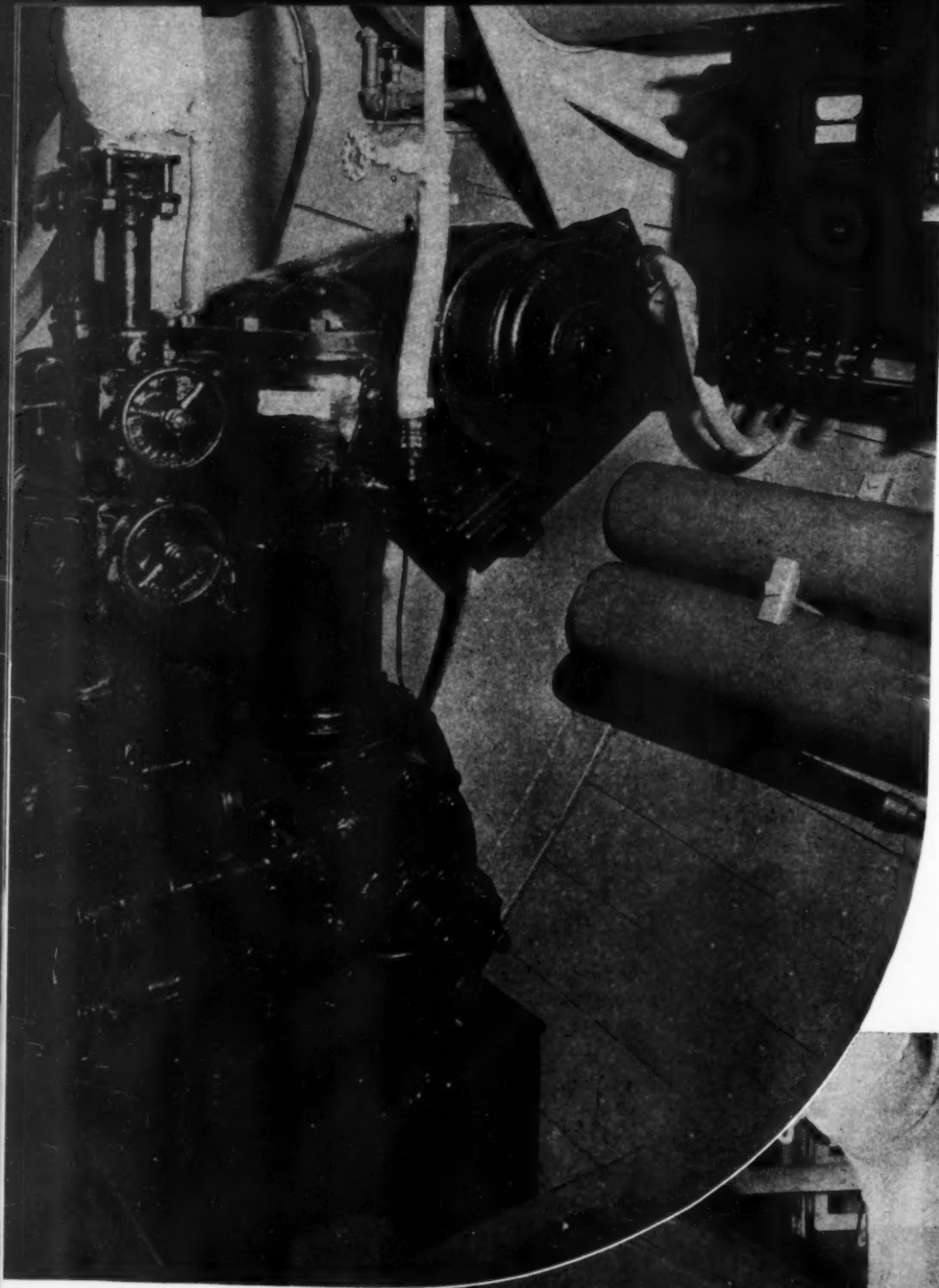
a terrific beating. That's one of the fields that with dirt-moving gave the U. S. its "secret weapon"—the bulldozer on the nose of a Diesel crawler tractor. It's too bad, the Big Town boys who feed the U. S. public its "Information" from the battle fronts don't know that a bulldozer is only an attachment on the nose of a Diesel-powered tractor, but that's the way it is and has been since this war broke and suddenly skyrocketed the tractor to immortal fame as the weapon that whipped Europe's best fighting armies after they were landed on European soil. Yet, that sky-rocketing was so speedy that only the attachment got the headlines while the hard-working tractor was lost by the headline-hunting news hounds of Press, Radio and Newsreels. Even Generals, taking their pen in hand via some ghost writers, showed this curious lack of knowledge of what a bulldozer was by completely ignoring the tractor that pushed it.

As it is today, practically every Diesel tractor going out to the war front for Marines, Army, Sea Bees or branches of these, carries both bulldozer and winch attachments to permit it to pull and cut its way out of any spot encountered. It's a tribute to the manufacturer, dealer and domestic peacetime user—farmer, logger, contractor, Government, oil field developer—that when their country went to war they had such tools available that they could drop their peacetime jobs and go into battle without special rebuilding and redesigning.

How many other pieces of equipment can you say that about in this war?



Cutting an air strip out of the forest at Geiger Field, Washington, the aviation engineers make good use of this Caterpillar Diesel tractor with LeTourneau bulldozer.

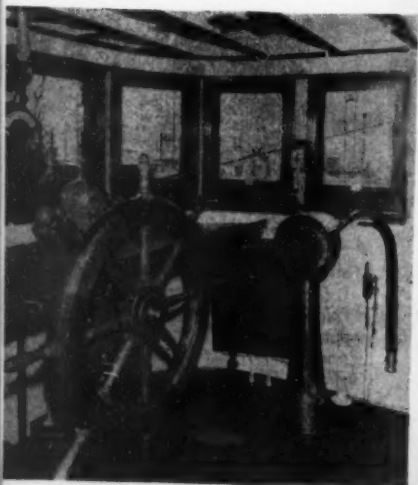


CALIFORNIA'S TUNA CLIPPER GETS A NAVY RATING

By JIM MEDFORD

Below: The two main Union Diesels. In this view looking forward are seen Manzel lubricator, Michiana filters, Weston tachometer and Marsh gauges. Lower right: the YP621 on trial run.

One of a pair of Frick refrigeration compressors—F-M motor driven.



Wheel house view showing Weston tachometer and Liquidometer rudder angle indicator.



DESIGNED in Southern California for the long voyage into Central and South American tropical waters, the tuna clipper is strictly a Pacific Coast ship. She has made such a name for herself that approximately 100 of the vessels have been purchased from their owners since about the time of Pearl Harbor for Navy use. Nowhere else in the world has such a fleet of long-range fishing craft ever been assembled, their home ports now ranging the shoreline of the West Coast.

Almost a quarter of a century of study and development has gone into the clipper's construction to give her the seaworthiness, the carrying capacity, the 10,000-mile cruising range, combined with the pleasing lines of sportman's yacht. And that was no over-night job for the naval architects. These sturdy wooden refrigerator ships driven by modern marine Diesels were tailor-made for their first war-time duty, that of "eyes" for the U. S. Navy in the broad coastal waters of the Pacific. And when the time came to ferry perishable food to the armed services out beyond Hawaii, the word went out from the Bureau of Ships to duplicate them "as is," so successful has been their record.

One of the first to be launched in the state of her creation, California, the YP 621, is the

product of Hodgson-Greene-Haldeman's Frank Hodgson, senior partner, and Art DeFever, naval architect, Long Beach; the second, an identical ship, will follow in the near future. Their length is 128 ft., with a maximum width over fenders of 30 ft. 6 in., a moulded depth of 14 ft., and a displacement of 700 tons, carrying capacity is 300 tons of refrigerated cargo. Hull construction required 325,000 b.f. of lumber with an additional 10,000 sq. ft. of fir plywood used in deckhouse. The single fir timber keel is 112 ft. long by 14 x 18 in., with sister keelsons and long length engine bed timbers. Fir frames are six-inch and doubled. Deck and wheel houses were pre-fabricated.

The main engine is a 6-cylinder, 14 x 19 in. Union Diesel, direct reversing, rated 560 hp. at 325 rpm. Heat exchangers are installed in the closed cooling system using fresh water for both circulating water and lube oil temperature control. Remote controls of mechanical type handle engine operation from wheel house.

The auxiliary engines are a pair of Union Diesels turning 125 kw. direct connected generators. The engines are rated at 150 hp. also fresh water cooled.

Main engine shaft is 6-in. steel, protected from

salt water corrosion by synthetic sheet rubber covering, turning 76½ x 50-in. bronze propeller. Fuel tanks have a combined capacity of 25,000 gals.

Two compressors supply the refrigeration, each individually driven 30 hp. electric motors. Engine room equipment includes two compressors, one electric driven, the other by a 4 hp. Witte Diesel, as standby units. In addition to electric fans in various quarters, ventilation is supplied to engine room by four exhaust fans, four 1000- and one 250-cfm. capacity.

Equipment items: Air compressor and motor, Ingersoll-Rand and F-M, and Witte Diesel set; generators by Allis-Chalmers; fuel and lube filters by Michiana; heat exchangers by Harrison; Marsh gauges and thermometers; exhaust silenced by Maxim; exhaust checked by Weston pyrometer; cooling water pumps by F-M also motors and other pumps; cooling system thermo control valve by Fulton-Sylphon; switchboard and gear by Ets-Hoken & Galvan; instruments by Westinghouse, Weston & Bludworth; water line valves by Crane; CO-2 fire equipment; Kingsberry thrust bearing; Westinghouse electric fans; Durkee steel hatches; lube oil control by Penn Electric Switch; fuel oil transfer pump by Westco; lube oil by Union Oil Co.

in this view
y, Michiana
ges. Lower



A BIT OF THE WEST'S TRACTOR HISTORY

Old Diesel Champ Links Up West's Tractor History

By F. HAL HIGGINS

"OLD TUSKO," they call her up along the Columbia River where Oregon looks across that famous stream at Washington. Tusko was the first Diesel tractor to come into the Northwest and she came in with a bang back in 1932 when she was acclaimed world's champ by reason of her 46-day plowing record set for her new owner, Mark Weatherford of Arlington, Oregon.

The heads of the agricultural engineering departments of three states came out to check her performance and issue a joint statement at the time Tusko's work really tore open an agricultural empire to the Diesel immediately without any fooling around. That was right down in the bottom of the trough of the depression when no farmer knew whether he would ever get back to profitable operations again. In fact, had there been any hope, they would have been closed out. No one wanted any farming at any spot if he wasn't stuck in the hole so badly he had nothing else to do but see it through. Well, Dumbo's performance was the rising sun on the Northwest's agriculture. Here's what the Oregon, Washington and Idaho farmer said of the Dumbo feat:

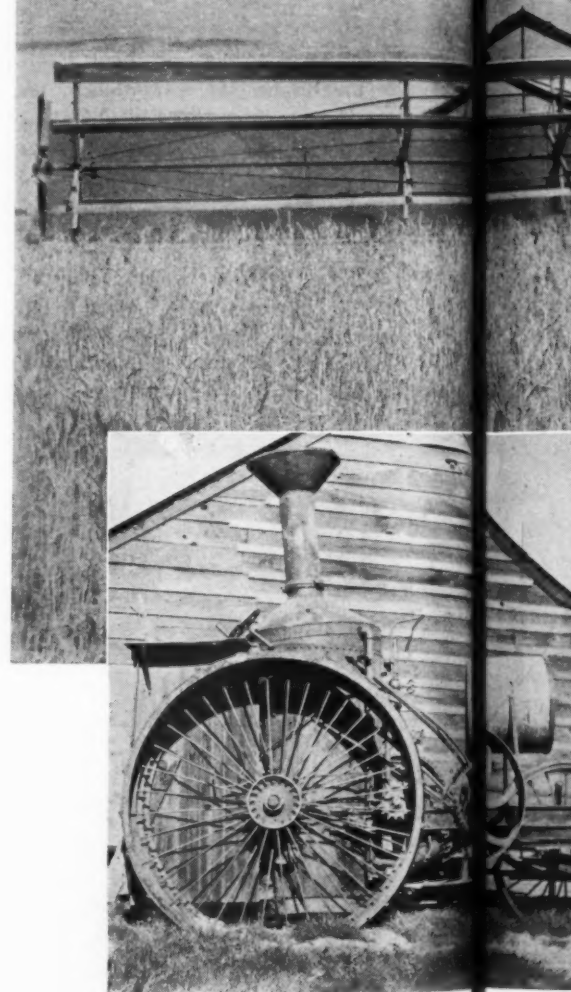
"Establishing world's records in plowing performance and in economy of fuel costs, the first Diesel Caterpillar track-type tractor to operate in the Pacific Northwest, on April 29, 1932, completed an amazing 46-day run near Arlington, Oregon, on the Fairview ranch of the Mark Weatherford holdings. As the group of 150 men from half a dozen states watched the Diesel tractor towing its string of plows across the eastern Oregon plateau in the closing hours of one of the most spectacular performances in the history of big scale power farming, some of them had the thought in mind that they were present at a historic event—witnessing the setting of a distinctive milepost on the long trail of agricultural history.

"Plowing about 700 acres on Mr. Weatherford's big ranches started on March 4, and with soil being turned 23 hours in every 24, some 6,880 acres were plowed in 1,055 hours' working time at a fuel cost of but 5.73 cents per acre."

One strange item noticed by the crowds as they journeyed out to this famous Diesel First during this 46-day run was an old upright steam traction engine sitting on a vacant lot in Arlington almost on the bank of the Columbia river. It looked like something out of a museum. The picture of it shown here was caught by the cameraman when Fred Lewis, an old Best serviceman with Daniel Best's Agricultural Works, happened along. Fred could recall many of these old steam tractors still in operation when he went to work for Daniel Best at San Leandro in the Gay '90's. Daniel Best was father of C. L., present chairman of the Caterpillar Board. This one sitting on the banks of the Columbia had been purchased by this same Mark Weatherford when he started tractor farming. It had been built at Albany, Oregon, in 1885 under Winchester patents before Daniel Best moved down to San Leandro to begin building his steam tractors, combined harvesters, crude oil engines, etc.

The Mark Weatherford ranching operations had run the cycle from the first Best to the latest "the best Best," said Weatherford as his first Diesel completed its plowing job that April, 1932, day! Of course, Best was only one of the main roots of this famous tractor builder of World War II, as Holt at Stockton in 1905 put his steam tractor on tracks for the first time and suddenly solved the farm tractor's 135-year up-hill search for enough traction to permit an engine to do work on soft, sandy, rough, up-hill terrain. That was the turning point in tractors for agriculture, logging, dirt moving and freighting over difficult terrain.

But to return to this old Oregon hero that linked up the past with the present when it rolled past that old Best upright steamer sitting disconsolately in the corner lot for all passersby to ponder. Mr. Weatherford has purchased later Diesel tractors, trading in his earlier Diesel for the latest models. But it is still running for another farmer, a neighbor. The new owner is W. A. Hartfield, and he reports it is approaching its 40,000 hour mark, passing 36,000 a year ago and rolling along with his regular grain farming jobs through the months since that report.

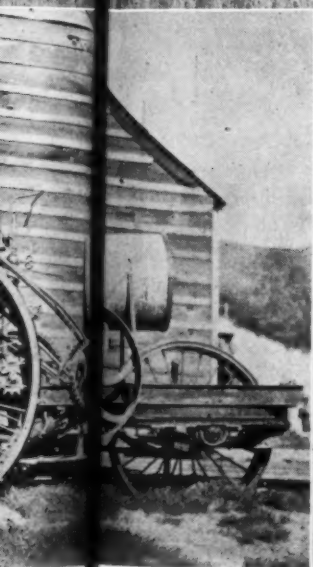


Now lost in the limbo of scrap driven this 1885 Vintage Best steamer was forerunner of modern Caterpillar Diesel tractors.

On the Hartfield lands, under war conditions, the old Diesel is going all out in handling its share of 12,000 acres of wheat lands overlooking the Columbia river here. Purchases since have added to the acreage until practically every acre in this area that can be put into wheat is so handled till war ends. Tusko, whose serial number is 1C12, is entitled to some kind of a decoration for her war effort.



Old "Tusko" still covers 70 acres a day pulling a 20 foot Combine, harvesting Rex wheat south of Arlington, Oregon.

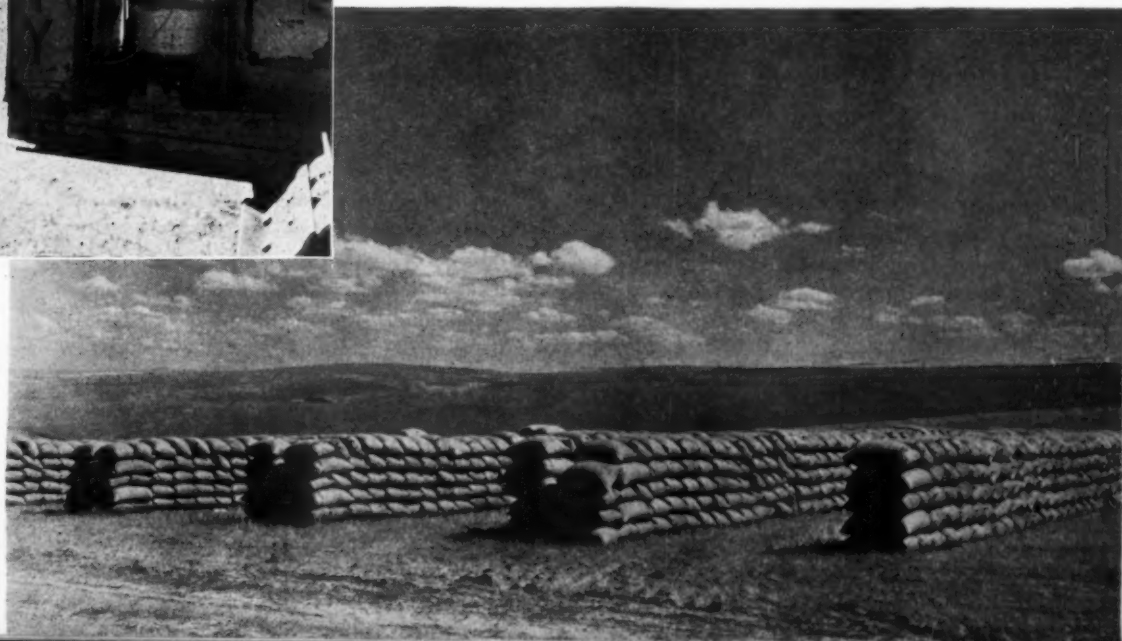


*scrap drives
teamer with
Caterpillar*



W. A. Hartfield places a fond hand on his Caterpillar Diesel tractor that has turned in better than 40,000 hours of hard work.

Product of 6000 acres of wheat land and three Caterpillar Diesel tractors plus some of owner Hartfield's sweat.



SUPERVISING & OPERATING ENGINEERS' SECTION

INSPECTION AND OVERHAULING OF DIESEL UNITS

Part 2

Conducted by R. L. GREGORY*

FOLLOWING through with the discussion of the above subject as begun last month, we will take up a typical case of a major overhaul job. The routine of inspection has been arranged, materials in stock checked and the Job Number A-100-1 assigned to this particular unit inspection. The work on this unit will be conducted by five maintenance men working under a Supervisor, the crew working eight hours a day and the work to be started on a Monday morning.

The first step to be taken is to divide the crew into units, each unit taking up one phase of inspection and repair. Coordination of effort is of vital importance in such a job and with each man knowing what his work is to be, a much better job of inspection and overhauling will be accomplished than where each runs around aimlessly working here and there and getting nowhere.

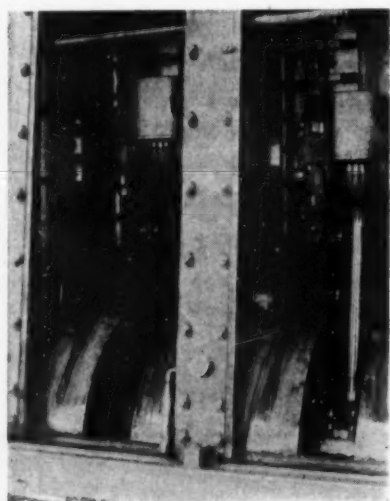


Fig. 1

Three men are assigned to removal of the inspection doors and preparing to unbolt the pistons from the crosshead. Figure 1 shows a section of a unit with two inspection doors removed for this work. These doors are removed and placed in proper rotation in some convenient out of the way place where they

* Chief Engineer, Municipal Water and Light Plant, Hillsdale, Michigan.

will not be in the way while the work is being done. The fourth member of the crew attends to the draining of the cooling system and the crankcase. In this particular instance the cooling system is drained into the sewer, while the crankcase is drained into a dirty oil tank, especially provided for that purpose. The fifth member of the crew with the help of the supervisor starts to dismantle the piping and auxiliary lines to the cylinder heads, removing the control rods and generally dismantling of bolts, etc., attendant to the cylinder heads.



Fig. 2

Figure 2 shows these cylinder heads removed and placed in a convenient position on wall board mats on the floor alongside of the engine, with space enough between each head to allow for inspecting and working room. The mats are placed beneath the heads so that the floor will not become marred or smeared up with oil or other foreign substances.

With the inspection doors removed and the cylinder heads out of the way, the studs and nuts holding the piston to the crosshead are removed and the pistons pulled and placed in proper rotation on the opposite side of the engine from the cylinder heads. These too are placed on wall board or fibre board mats. When this is accomplished the crew is ready to begin their individual jobs. Two members remove the piston rings from the pistons and clean the grooves and pistons up for inspection. Two more members are put at cleaning the liner

walls, ports and preparing the liners for inspection while the fifth member of the crew with the supervisor begins inspection of the cylinder heads and the dismantling of the fuel inspection and air apparatus in the cylinder heads. Since fuel injection equipment is of vital import it is always well to have the men most familiar with this equipment attend to this work.

Returning to the men working on the pistons: inspection of the pistons shows that they have a few broken rings, but none of which is stuck. Others are found to be worn thin while still others especially those near the top of the piston are found to have lost some of their tension. Therefore it is decided to replace all rings on all pistons, saving those which might be used again after cleaning up in case of emergency. These are placed to one side to have further checking and inspection later. Complete new sets of rings are taken from stock and a dispersal sheet with the Unit Job number is issued to the stock room for this material. The pistons are checked for cracks, scoring, etc. and if found in good condition after cleaning up, the rings are installed and these pistons are ready for reinstallation in the unit.

The two members of the crew have the ports . . . And now please turn to page 88 . . .



Fig. 3

or inspec-
rew with
cylinder
l inspec-
er heads.
vital im-
en most
to this

pistons:
hey have
is stuck.
hile still
of the
of their
replace
e which
o in case
ome side
on later.
en from
Unit Job
for this
r cracks.
ondition
lled and
n in the

he ports
S



IT DELIVERS A

"Sunday Punch"

THIS is the M26, the most powerful tank ever built in America. Packing a 90MM gun, weighing 45 tons, this huge monster has astounding flotation power due to wide treads.

The best of equipment was specified for this hard-hitting monster. On many, you'll find

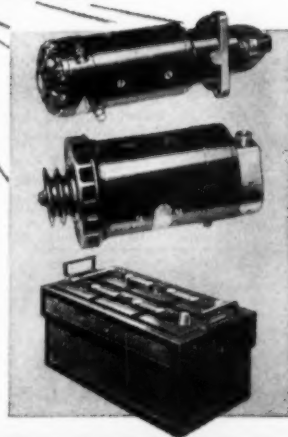
starting motors, batteries and generators, precision-built by Auto-Lite.

Such heavy duty electrical equipment, improved to meet tough wartime requirements, will soon be delivering superior performances in peacetime applications. Address inquiries to:

THE ELECTRIC AUTO-LITE COMPANY

TOLEDO 1, OHIO

SARNIA, ONTARIO



AUTO-LITE

TUNE IN "EVERYTHING FOR THE BOYS" STARRING DICK HAYMES! — EVERY TUESDAY NIGHT — NBC NETWORK

Exchange Your Diesel Maintenance Ideas

COMMUTATOR MAINTENANCE

By C. B. HATHAWAY*

COMMUTATOR maintenance of industrial size motors can be made easier when an understanding exists of what goes on in the motor. A commutator, being an assembly of many parts, is only good as long as all of the parts stay in the same mechanical location with respect to each other. If one or two bars move out of place with respect to the others, the commutator becomes rough and sparking will occur when they pass under the brushes.

Practically all commutators used in industrial machinery in sizes above 1 hp. are of the vee type. In such a commutator, a vee-shaped groove is machined in each end of the copper commutator bars and separating mica segments. A corresponding inverted vee is machined at the back end of the commutator bushing and in a separate retaining ring that assembles at the other end of the bars. The bars are clamped between the two vee rings and are insulated from them by a molded mica vee ring.

The machining of the vee ring on the bushing and steel retaining ring must bear a definite relation in radius to the machining of the vee grooves in the bars. Before assembly, the steel vee rings have a slightly smaller diameter than the vee grooves in the bars. When assembled,

the pressure applied to the steel retaining vee ring draws down on the inner edge of the vee groove of the commutator bars as indicated by arrows marked "B" in Figure 1. This reduces the diameter of the assembled segments and thereby places them in arch binding.

It is also important to have the upper edge of the vee groove, as indicated by arrows marked "A" in Figure 1, make firm contact with the mica vee rings and the commutator steel parts. This provides a seal against the entrance of dirt at the edge of the bars and also puts an outward stress against the tips of the bars. With this initial stress in the ends of the bars they are less likely to be thrown outward due to centrifugal force when the commutator rotates. The ends of the bars will not move until the outward stress due to the centrifugal force exceeds the initial stress in the bars.

The necessary elasticity to compensate for expansion and contraction in the commutator resulting from different temperatures is provided in the mica. The strain placed upon the mica segments in compression must be such that the bars are held firmly together when the commutator is cold and must be within the elastic limit of the mica when the commutator is hot. The rise in temperature of the commutator is of course accompanied by the expansion of the copper in all directions. The chief concern is with the expansion that occurs in the bars circumferentially. If the commutator has especially long bars some provision must be made to absorb the expansion along the length of the bar.

Both the mica segments and the mica vee rings

are made up from flake mica which has a diameter of about $1\frac{1}{4}$ in. The flakes are held together with shellac. The built-up mica parts are thoroughly pressed and baked before they are assembled with the other parts of the commutator.

All commutators should be seasoned after assembly with new mica parts. The purpose of the seasoning is to drive out all excess shellac at the pressure points. This can be done with one heating and tightening but a much better job results when the operation is repeated several times.

An oven in which commutators are seasoned should be held at a temperature between 160° and 180° Centigrade. The temperature of the commutator should not be permitted to exceed 150° Centigrade or slippage of the mica flakes will occur when pressure is applied. These mica flakes will come out above the surface of the bars. There is no danger of annealing the copper which has been cold worked to obtain hardness at these temperatures. Cold worked copper will not anneal until temperatures above 200° Centigrade are encountered.

Commutation is a maintenance problem because of the damage done to the commutator by the brushes. Sparking at the brushes, if at all severe, results in burning the surface of the commutator and causing the brushes to ride poorly. The effect is cumulative and continues until the sparking becomes so bad a flashover may occur and as a result, the machine must be withdrawn from service and repaired.

To be concluded

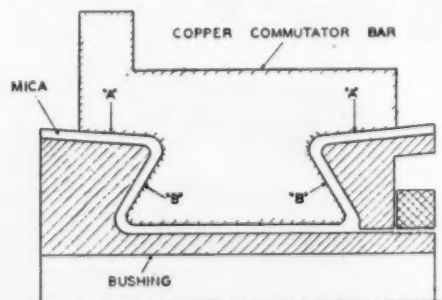


FIGURE 1

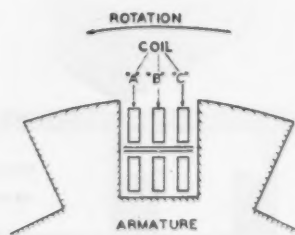


FIGURE 2

Fig. 3



which has
flakes are held
up mica part
d before they
ts of the com

oned after a
ne purpose of
excess shells
be done with
much better
is repeated

are seasoned
between 160°
ature of the
ted to exceed
e mica flakes
plied. These
he surface of
annealing the
ed to obtain
Cold worked
efimperatures
ntered.

problem be
commutator
brushes, if a
surface of the
shes to ride
nd continues
l a flashover
achine must
paired.



*Engine builders
have recognized*
**SEALED POWER
SUPERIORITY**
over 33 years

For more than 33 years major engine builders have honored Sealed Power as the leader in the field—have recognized Sealed Power laboratories and manufacturing facilities as the standard of comparison in this industry. Sealed Power will welcome an opportunity to help make your good Diesel engines even better.



SEALED POWER CORPORATION
Muskegon, Michigan • Windsor, Ontario

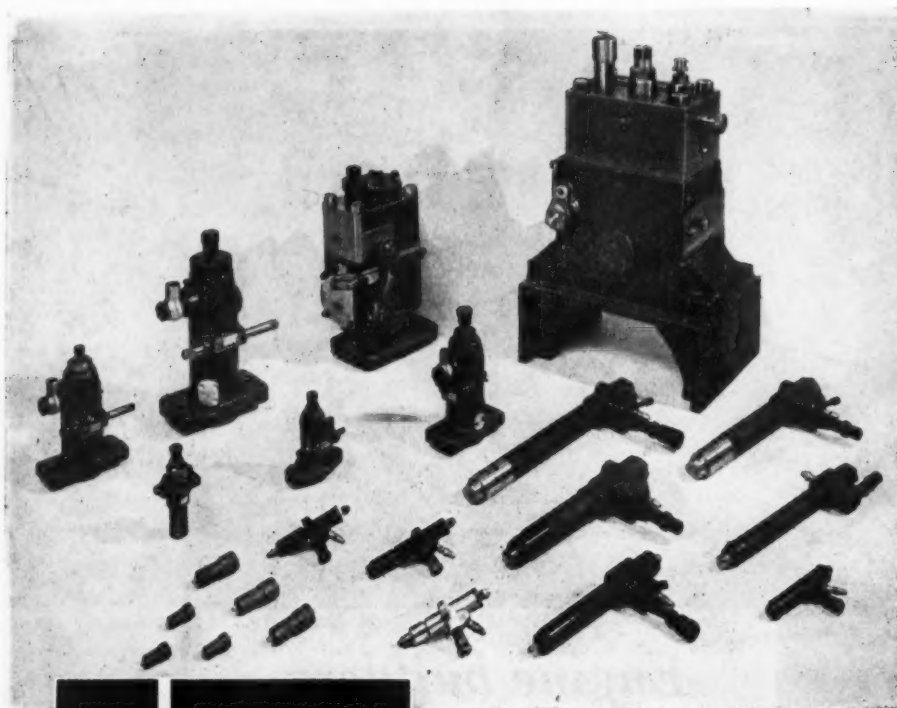
Buy More War Bonds And Keep Them!
Pay \$3 — Get \$4!

This high production offset grinder puts a super finish on automotive piston rings, a finish of 15 micro inches. A micro inch is one-millionth of an inch.

SEALED POWER

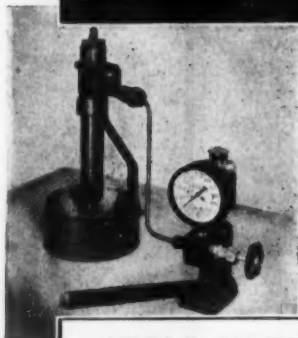
PISTON RINGS

PISTONS — CYLINDER SLEEVES



adeco...

YOUR SOURCE FOR DEPENDABLE FUEL INJECTION EQUIPMENT



ADECO NOZZLE TESTER For Low-Cost Maintenance

America's most widely used nozzle tester enables any mechanic to make quick, accurate tests on injector opening pressure, spray pattern, etc., and detect stuck needle valves and leakage around valve seats. Compact, portable, sturdy, precision-built. Pressures up to 10,000 p.s.i. Tests both large and small injectors on bench or engine. Prevents costly delays and possible damage to engine. Standard or Navy-approved gauge. Ideal for testing hydraulic equipment. Write for bulletin.

Whether you need standard fuel injection equipment or special units built to your specifications, Adeco offers the logical source of supply.

Today's line of Adeco equipment, the outgrowth of long experience in serving the Diesel industry, includes: Standard fuel injection pumps in plunger diameters from 7 mm. to 31 mm.; a complete line of standard nozzles and nozzle holders, including the water-cooled type; and the Adeco nozzle tester.

All Adeco products are built to highest standards, with years of trouble-free operation behind them to testify to their reliability.



AIRCRAFT & DIESEL EQUIPMENT CORP.
4401 NO. RAVENSWOOD AVE. • CHICAGO 40, ILLINOIS

Supervising: Continued from page 82

cleaned and the liner walls in shape for miking. The wear on the liner is generally determined by taking readings at four positions on the liner, four inches below the top, eight inches below the top, three inches above the ports and three inches below the ports, all readings to be taken on the four quarters, namely parallel with the shaft, 45° from parallel, 90° and 135° from parallel. A record is taken of each reading and these noted. This gives you two main and important items of information when kept from year to year. First the amount of wear in the last year's operation when the last year's readings are subtracted from the present ones and secondly as to whether by comparison, your liners are wearing true and not out of round. Comparison of the total year's wear (average) divided by the number of thousand hours operation, in this particular instance showed that a normal wear of from .003 in. to .004 in. per thousand hours had been obtained. This was not out of line with Diesel operation on a large unit. These results are then filed in your record of the plant for future reference at inspection time.

However one item was noticed. After several thousand hours operation a shoulder was developing on the liner at top piston stroke and it was decided to remove this shoulder. This was accomplished by use of a high speed portable grinder with a flexible shaft and using a good grade of emery wheel. In order that emery dust, carbon from the ports, etc. would not get down into the crosshead or on the guide, these parts were thoroughly covered with large clean rags, which were carefully removed upon completion of the job. When the grinding had been accomplished a finish was put on the liner by means of a good oil stone especially made for that purpose.

While these members of the crew were busy with the liner walls, the fifth member and the supervisor were removing the fuel injection apparatus and found that several new needle valves were desirable; some of the atomizer parts had to be renewed; that some of the flame caps were worn out and some of the flame plates, in this particular instance with an original opening of .266 in., were in need of replacement. They also found that the fuel check valves were sticky and had to either be relapped or re-placed. Therefore another requisition was made to the stockroom and another dispersal sheet carrying the job number was made on this material.

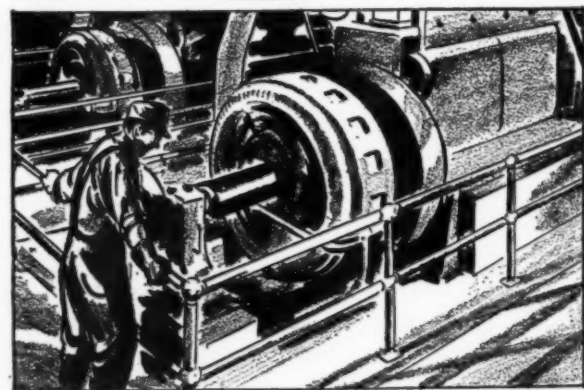
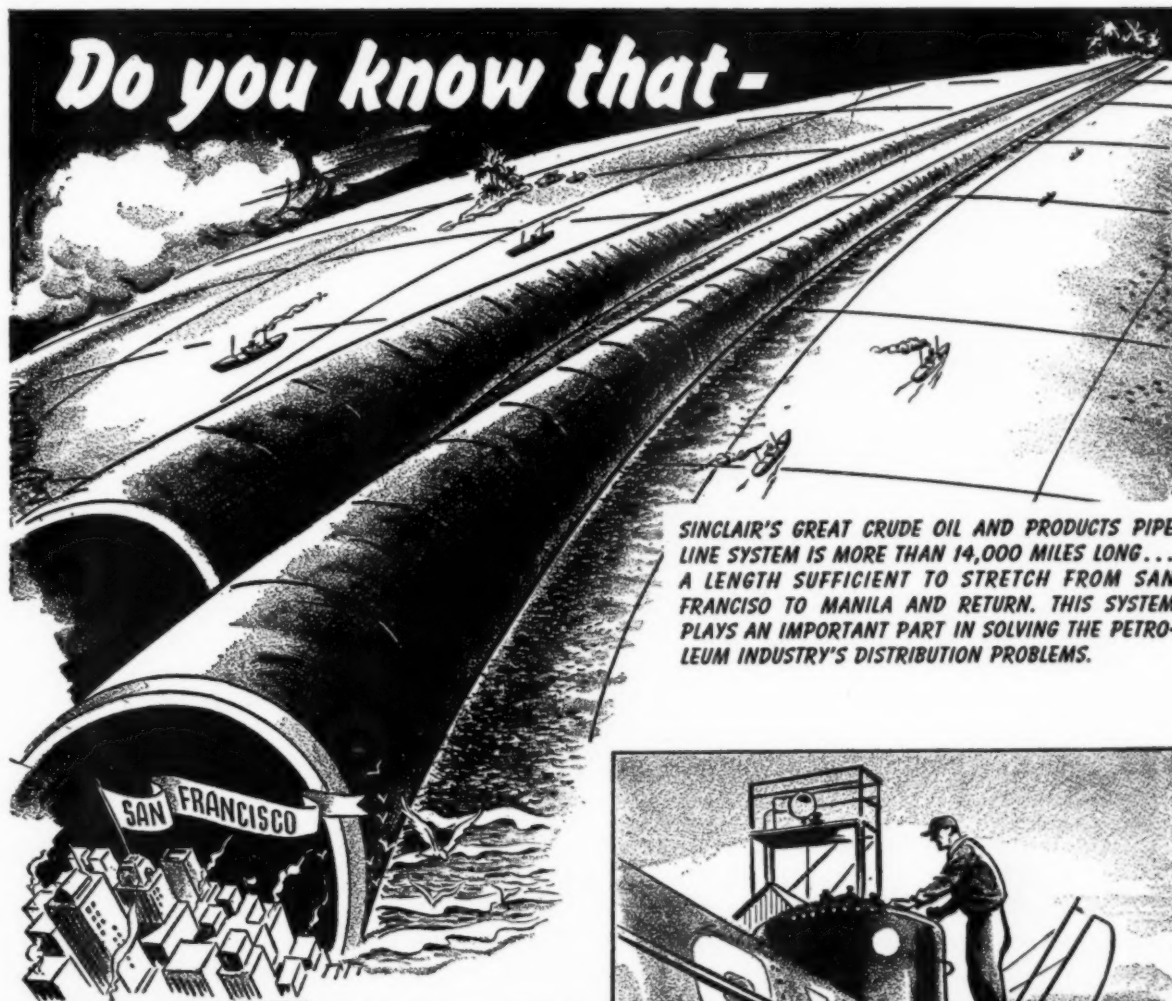
... And now please turn to page 90 ...

or miking.
etermined
s on the
ht inches
the port
readings
ely paral-
90° and
n of each
you two
formation
e amount
when the
from the
ether by
true and
the total
number
particular
of from
ours had
line with
se results
plant for

r several
was de-
roke and
er. This
eed port-
using a
der that
c. would
on the
red with
removed
ne grind-
was put
oil stone

ere busy
and the
injection
y needle
atomizer
of the
of the
ce with
in need
the fuel
ither be
ther re-
and an-
number

0 . . .



FOR BETTER DIESEL LUBRICATION SINCLAIR PROVIDES RUBILENE AND GASCON OILS WITH NON-CORROSIVE, SLUDGE-RESISTANT QUALITIES THAT INSURE CLEAN ENGINES. TEN-OL, NEW FOR DIESEL LUBRICATION, FULLY MEETS U. S. ARMY SPECIFICATION 2-104 B.



SINCLAIR OWNS AND OPERATES MORE TANK CARS THAN ANY OTHER OIL COMPANY IN THE UNITED STATES. THEY TRAVEL MORE THAN 325,000,000 MILES ANNUALLY TRANSPORTING PETROLEUM PRODUCTS.

SINCLAIR IS EQUIPPED TO SERVE YOU BETTER!

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.



Briggs Lube Oil Clarifier on 150 HP Cummins Diesel Shows Value of Effective Lube Oil Filtration . . .

The record of savings in lube oil and engine maintenance that a Briggs Lube Oil Clarifier and a Briggs Fuel Oil Clarifier produced on this engine is typical of what really effective filtration can do . . . and will do . . . for you.

Compare facts like these with the operating record of your engine or engines . . . Operating hours, 24 hrs. per day . . . Oil change periods used to be every 250 to 300 hours, NOW 3 YEARS ELAPSE BETWEEN OIL CHANGES . . . Piston rings only replacement parts (routine, whether needed or not) since installation of Briggs Clarifiers—6 years ago . . . Fuel pump screens have not been dirty enough to clean since Clarifiers were installed.

Look in your classified telephone directory under "Filters"—find the name of your Briggs Distributor. Get the complete, amazing story of Briggs Clarification from him or write direct for literature. No matter what size or type internal combustion engine you operate—there is a Briggs Clarifier designed to do an effective oil filtration job for it.



Supervising:

Continued from page 88

Overhauling of this equipment is usually rather a long job if done right and the other members of the crew then removed the wiper ring or oil catcher assembly from the bottom of the liners. While two members of the crew were cleaning these assemblies up for inspection, the other two were cleaning the mud ring and drain lines which carry this excessive oil down to a reclaiming container. When the wiper ring assemblies were inspected it was found that the wiping edge, after nearly six years of operation were becoming dull, and with new ring assemblies in stock, these two were requisitioned from stock with the job number attached. The old assemblies were not discarded but were returned to stock and will be sent in for reconditioning at a later date, since their tension is still retained.

With these assemblies completed, they were again installed and the four crew members working on them then dismantled the oil lines to the various lube ports in the liner walls, cleaned the check valves and blew the lines out with air, then reassembled them and by operating the lubricators manually, forced oil through them to see that each port was providing oil as required. Then the crew being ready to reassemble this part of the unit, replaced the pistons, fastened them in place to the cross-head and replaced the cylinder heads which had been completed. Three members of the crew then began cleaning of the auxiliary piping and as they got it cleaned, the other three began assembly of the various pipe lines and controls to the cylinder heads and fuel equipment, tightening down cylinder heads, etc.

With this phase of the work complete the crew then was divided again, two men being assigned to removal of the camshaft covers, inspection of the cams, shaft, starting valves and apparatus, etc. Figure 3 shows the operating side of the unit with these covers removed, ready for inspection. Some new replacement parts were necessary and inspection proved that some slight adjustments should be made.

While this work was being carried on the supervisor and balance of the crew were checking clearances, shaft alignments, etc. Rod bearing, main bearing, guide, and pin clearances were all taken and the results tabulated and compared with those of the previous inspection. In this particular instance all tolerances were found to be normal. Crankshaft alignment was taken by means of a strain gauge between the various webs on the four quarters and compared . . . And now please turn to page 92 . . .



"Armor"

**YOUR BEARINGS AGAINST WEAR
WITH N·B·M SILVER BABBITT**

Like a protective coat of armor, N-B-M Silver Babbitt shields shafts and bearings from the effects of high speeds and heavy loads. In three years of ceaseless wartime service, it has proved equal to tin-base babbitts on every count. • When you specify N-B-M Silver Babbitt, you will be certain your bearings and shafts are well protected.

NATIONAL BEARING
DIVISION
ST. LOUIS • NEW YORK

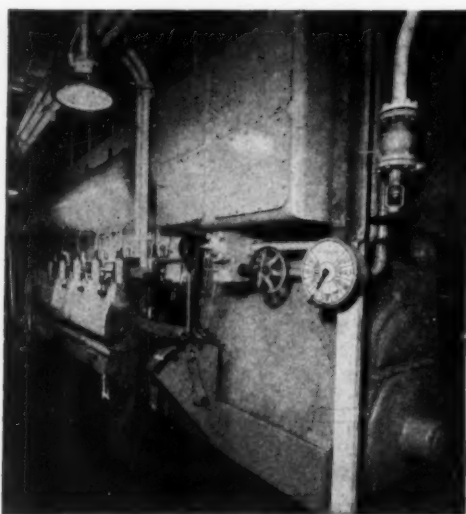
AMERICAN
Brake Shoe
COMPANY



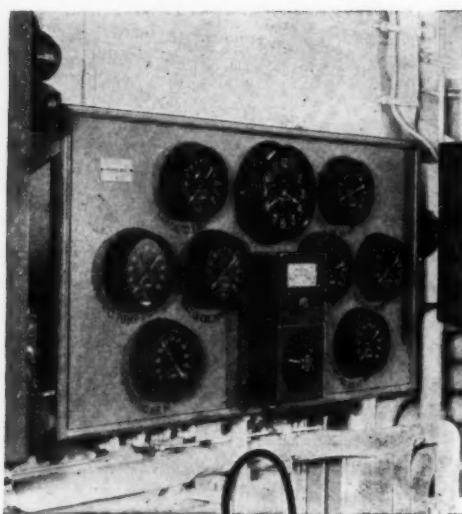
PLANTS IN: ST. LOUIS, MO. • PITTSBURGH, PA. • MEADVILLE, PA. • JERSEY CITY, N. J. • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.



Nordberg Propelling Engines equipped with *Alnor* Exhaust Pyrometers



A 1700 hp. Nordberg propelling engine used in a C1-M-AV1 Cargo Ship.



Alnor Exhaust Pyrometer designed especially for Diesel engine installation.

Many of the Maritime Commission Type C1-M-AV1 Cargo Ships helping to carry supplies all around the world are equipped with Nordberg propelling engines, and Alnor Exhaust Temperature Pyrometers. The constant watch upon exhaust temperatures with Alnor Pyrometers provides a reliable guide to proper adjustment, proper operation and efficient performance of these Diesel engines. Alnor Pyrometers are designed especially for this service, and provide reliable indications that permit efficient operation even under the severest service conditions.

There is an Alnor Pyrometer designed for every operating need, on large or small engines.

Write for descriptive bulletins.

ILLINOIS TESTING LABORATORIES, Inc.
420 North La Salle Street
Chicago 10, Illinois

Supervising: Continued from page 90

pared with previous readings. These too were found to be normal.

Both jobs being completed, the next step was inspection of the fuel pump assemblies, all of which were completely dismantled and overhauled. Several new parts were installed replacing worn parts, and the check valves cleaned and relapped or in case of too much wear, replaced. These items were taken from stock. While part of the crew was on this work the balance were checking over the auxiliaries, pumps, safety devices, etc., replacing worn parts, repacking pumps, etc.

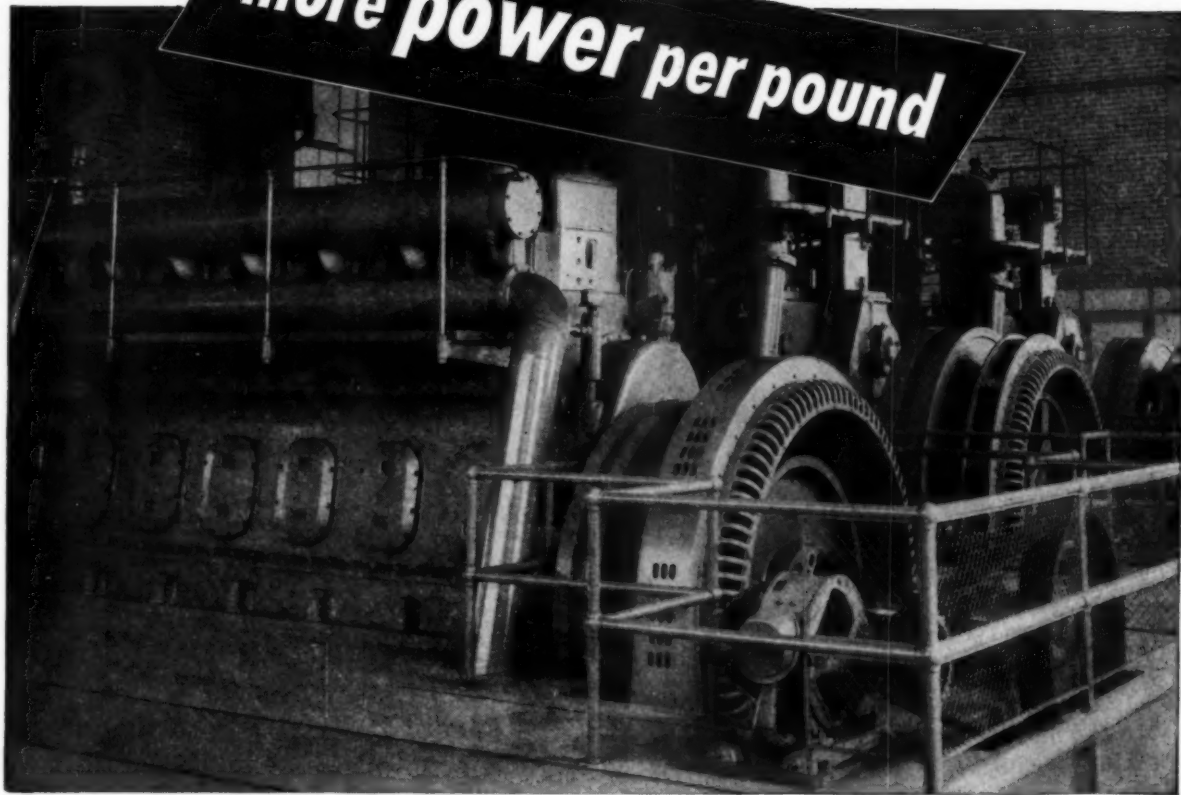
With these steps taken care of the next step was inspection of the compressor and the valves in the various stages. Clearances were taken in the various stages and adjustments made. Connecting rod bearing and bolts checked and the whole compression system completely gone over. This work required the cooperation of the entire crew.

The crew then divided into two groups, one of which removed and cleaned the scavenging valves, cleaned out the scavenging header and reassembled the valves. While this group was attending to this phase the rest were checking over the blast governor, regulating governor and the unit governor, carefully inspecting and cleaning each part.

The next step was cleaning of the heat exchangers and testing of the cooling coils. The face plates were removed and the exchanger thoroughly cleaned, while the cooling coils were given a hydrostatic test of several hundred pounds. This is an important item, since copper cooling coils, especially on the high stage with air passing through them at 1100 lbs. pressure and great velocity have a tendency to spring leaks at their junction with the header and also wear very thin in time. These should be inspected at regular intervals and if found defective, given immediate attention, since disastrous results have been known to occur from neglect in this matter. While the coils and heat exchanger were being inspected, the drip legs or separators at the bottom of each stage, were dismantled and cleaned. Carbon residue from oil, sludge and other foreign material collect in these separators and clog up the drains or blowoffs if not cleaned. This builds up a back pressure in the compressor stages which is not desirable and which often has serious effects on operation. It is therefore advisable to clean these separators at each inspection.

To be continued

more power per pound



ONE of the important achievements of Baldwin engineering

The picture tells the story of one important Baldwin development. The Baldwin Diesel in the foreground generates almost as much power single-handed as the *two* larger diesels in the background: 500 kw. as against a combined output of 540 kw

The Baldwin VM Diesel incorporates every successful advance in 4-cycle diesel design, while providing an economical, compact, highly efficient unit that requires a less expensive generator than low-speed engines, demands a

smaller foundation, and can be housed in a smaller engine-room. It offers real profit possibilities to plants requiring dependable, low-cost power in a 500-1000 hp package. The special injection-combustion system makes the engine less sensitive to variation in fuel oils. All moving parts are enclosed, but are easily accessible.

The comprehensive line of Baldwin Diesels includes a type to fit each need. Talk to a Baldwin representative before you buy. The Baldwin Locomotive Works, Philadelphia 42, Pa., U. S. A. Offices: Philadelphia, New York, Chicago, Washington, Boston, Cleveland, St. Louis, San Francisco, Houston, Pittsburgh, Detroit.

BALDWIN PRODUCTS

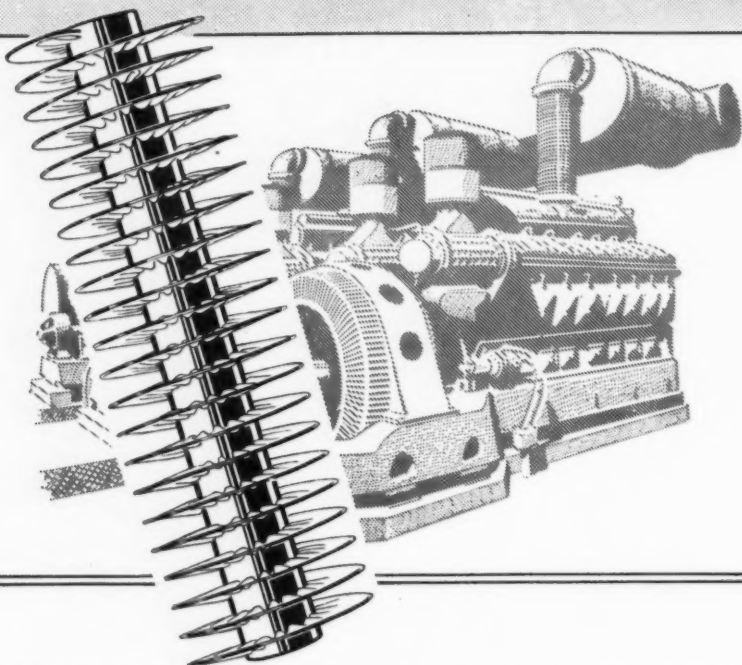
Hydraulic presses, Testing equipment, Steel forgings and castings, Diesel-electric locomotives, Diesel engines, Metal plate fabrication, Rolled steel rings, Bronze castings, Heavy machine work, Crane wheels, Bending rolls, Plate planers, Babbitt metal, Alloy iron castings, Briquetting presses.



BALDWIN

DIESEL ENGINES

Diesel Makers are finding Compact, Efficient Aerofin The Ideal Cooling Surface



IN THE Diesel industry, as in other industries revolutionized by the war, Aerofin Corporation has solved new cooling problems with new designs of its adaptable cooling surface.

If you make or use Diesels for transportation, light and power, construction work, cold storage, logging, mining, irrigation or in any other Diesel application, investigate the superiority of Aerofin for cooling. Ideal for condensing or cooling any gases, liquids or vapors at high temperatures and pressures.

Aerofin is the most widely used extended-surface heat exchanger because of its high heat exchange and the fact that it is very light, compact, rugged, and guaranteed flawless in construction.

AEROFIN
CORPORATION

410 So. Geddes St., Syracuse, New York
Dept. D8

Chicago

Philadelphia

Detroit

Cleveland
Dallas

New York
Toronto

JUST OFF THE PRESS

THE 1945 Edition of the DIESEL ENGINE CATALOG, Volume 10, is ready for distribution. It is the largest edition yet published—520 pages, hundreds of illustrations—a *Composite Catalog* of the *Entire Diesel Industry*. Page size 10½ in. x 13½ in.—a big book and a real value. A separate section devoted to each manufacturer's line of engines with completely illustrated descriptions and specifications—covering stationary, marine, automotive and railway types. Other sections cover Diesel accessories such as fuel injection equipment, chain and gear drives, electric, hydraulic and mechanical couplings, superchargers and many other items. Also contains a directory of products and manufacturers. An indispensable book for all interested in Diesels. Paper restrictions limit the supply so order your copy promptly—a convenient coupon will be found on page 115 of this issue.

Detroit Diesel Appoints E. F. Bentley

ANNOUNCEMENT recently was made by V. C. Genn, Sales Manager of Detroit Diesel Engine Division, General Motors Corporation, of the appointment of E. F. Bentley as contractors' equipment sales manager. Bentley succeeds A. N. Anderson, now Detroit Diesel Engine dealer in Los Angeles.



E. F. Bentley

Bentley has been associated with Diesel Divisions of General Motors since 1934. After five years with the Cleveland Division he transferred to Detroit, where he served as supervisor of the controlled material plan activities and as a member of the purchasing department buying all production electrical items.

MODERN DEVELOPMENTS OF GASKET RESEARCH



CYLINDER HEAD

To supply modern Diesel Engine requirements, Goetze has developed and supplied a large number of standard and special Cylinder Head Gaskets. For instance, one group of machines has been turning out special copper marine engine gaskets at maximum production since one year before we entered the war — totalling many millions of gaskets that have done their small part in shaping the World of Tomorrow.

The design of Cylinder Head Gaskets varies widely according to individual requirements — square, round, diamond-shaped, in the standard types, and many special shapes predominate in solid metal gaskets. In addition, metal-jacketed asbestos types are also popular with many manufacturers and engine operators.

What are your requirements — standard or special?

The illustrations above and at left give a partial picture of Goetze's facilities to serve you.

Write stating your problem. Also ask to have your name added to the list of engineers receiving "The Gasket" — a series of technical bulletins containing original gasket data emanating from the Goetze Research Laboratory. Write on your company letterhead giving your position.

GOETZE GASKET & PACKING CO., INC.

32 ALLEN AVENUE, NEW BRUNSWICK, NEW JERSEY

Boston	New York	Philadelphia	Pittsburgh
Cincinnati	Cleveland	Detroit	Chicago
Houston	San Francisco	Los Angeles	Montreal

Goetze

for

GASKETS



"America's Oldest and Largest Industrial Gasket Manufacturer"

**KEEP YOUR
DIESELS
OPERATING
BETTER,
LONGER
AND AT
LESS
COST!**



You probably bought Diesel equipment because it could deliver more flexible power, longer at less cost than other power.

To keep that equipment delivering top power longer, more economically and with a minimum of service cost—and especially with less time out for overhauls,—you need HALL Diesel Valve Servicing Equipment.

Write us today for complete information on the Model EDP Grinder shown above and the HALL Model 80A Valve Refacer—both designed expressly for servicing Diesels.

THE HALL MANUFACTURING CO.

TOLEDO 7, OHIO

HALL

Diesel Type

VALVE SEAT GRINDER

WPB Takes Step Relaxing Controls on Segment of Diesel Industry

By WILLIAM J. MADDOX *

WASHINGTON.—In relaxing its scheduled restrictions by the July 5 amendment to order M-293, War Production Board has taken a long step toward turning the production of Diesel and Natural Gas Engines back to the manufacturers. Under the new arrangement manufacturers of engines of 750 RPM and less except for marine use can take unrated orders. Most manufacturers, WPB officials say, are in a position to turn their plant facilities to production of such orders.

In line with the order as revised, however, the engine plants will have to fill the "frozen" orders shown in their July schedules, and the engines will have to be shipped as scheduled. But otherwise manufacturers can accept orders and fill them without reporting to WPB. Thus the WPB 3003 report covering orders scheduled as of July 1 will be the last report for Diesel and Natural Gas Engines that manufacturers are required to file. Orders scheduled subsequent to this report and not included in it will not become part of their "frozen" schedule.

One reason given by WPB officials for the change is that military requirements for the heavy-duty type are gradually decreasing. Also, the situation regarding materials and manpower available for Diesel engine manufacturing have shown considerable improvement. At the beginning of the war heavy-duty type engines were in demand for powering such new war plants as were needed for turning out ordnance and aircraft. The demand was so great that engines of this type being built under order for municipal plants were requisitioned to meet the demands of the military. When these war needs eased up manufacturers were allowed to take orders from municipal and industrial power plants. But the demand from these users became so great that WPB

found it necessary to give the orders a rating. Under a revised priority system issued by WPB June 30, after December 31 this year the present system of AA ratings (AA-1, AA-2, AA-2X, AA-3, AA-4, and AA-5) and the controlled materials plan will be discontinued. It will be replaced by the AAA rating which will still be assigned in emergencies as under existing procedure and the new MM rating which will

be assigned to the Army and Navy and other military agencies. After the end of this year, therefore, Diesel engine manufacturers will have to obtain their material where they can that is needed to finish up their unrated orders.

WPB officials, however, are confident that by the end of this year the material situation will be much freer than it is now and that manufacturers of Diesel engines will not experience generally any hardship in obtaining their

requirements. There will be someone here at WPB, they say, to help out in case difficulties do arise.

In spite of the present relaxation in restrictions, WPB still keeps one string on the freedom of manufacturers in accepting unrated orders—that is, if and when any military orders come in for heavy-duty types the agency has the right to set aside these commitments. There still is on the horizon, officials point out, the possibility that the army may find that some heavy-duty Diesels are needed for rehabilitation in Europe. If so, the military's requirement for these would come under the MM rating.

The new amended order provides a method by which manufacturers should adjust their frozen schedules in case they are unable to fulfill them on time or in case they are able to make shipments ahead of schedule. In either case WPB must be notified of appreciable delays or step up in shipments, and so far as practicable the

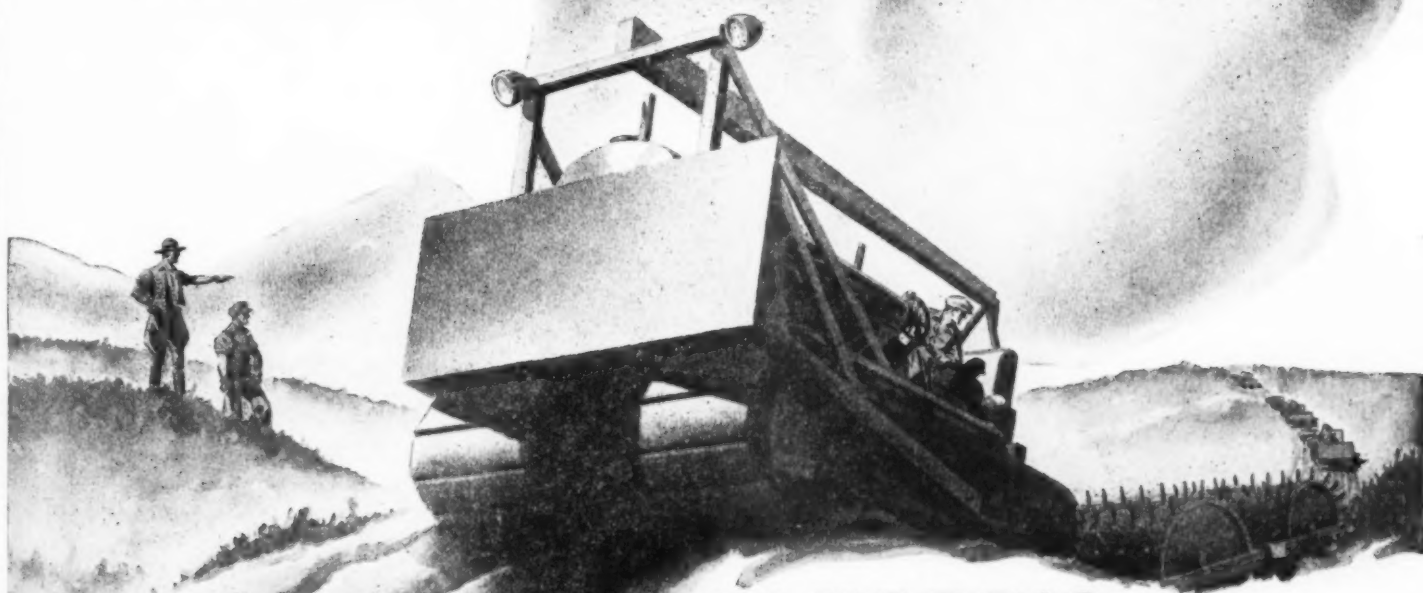
... And now please turn to page 102 ...



William J. Maddox

* Chief of DIESEL PROGRESS' Washington Staff.

Parts with guts for the job



McQUAY-NORRIS ALUMINIZED PISTON RINGS

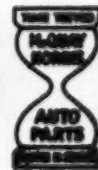
In trucks, tractors, locomotives, ships... wherever there is work for Diesels, McQuay-Norris parts are giving efficient, dependable, economical performance. With 34 years' experience in precision manufacture, McQuay-Norris includes the Diesel field in its achievements in metallurgical development, heat treating, clinical research and engineering design. Send us your blueprints.



McQUAY-NORRIS

MANUFACTURING COMPANY

ST. LOUIS, MO.



PRECISION WORKERS IN IRON, STEEL, ALUMINUM, BRONZE, MAGNESIUM

WPB: Continued from page 100
sequence of the orders given in the schedule must be observed. Whenever an order is removed from a frozen schedule the manufacturer is required to make his shipments under later scheduled orders as nearly as practicable in the sequence, moving up the shipping dates of other orders. It is not necessary, however, to ship any order in advance of its required delivery date.

In case of an appreciable delay or speed up in production and shipment, notice in writing to the WPB must give the cause and the revised dates on which shipments on each purchase order is expected to be made. A canceled order must be removed from a frozen schedule. Any substantial change in a purchase order removes it from the schedule, and a request for reinstatement must be made within ten days or it will be treated as an entirely new order.



FREE ACCESS TO TUBES SIMPLIFIES COOLER MAINTENANCE

Periodic inspection of any cooler is desirable in order to maintain maximum performance efficiency.

In the Ross "CP" design tube inspection is accomplished in a quick, simple manner. By merely removing the cover plate, you have access to the inside of the tubes. Removable tube bundles give access to outside of the tubes.

When inspection reveals the necessity of cleaning the tubes, no additional dismantling is necessary.

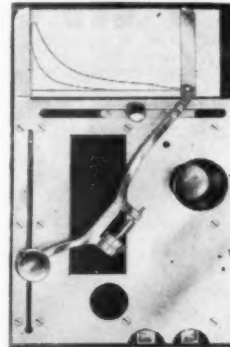
Complete details and illustrations on tube cleaning are given in **BULLETIN 5322**. Write today.



ROSS HEATER & MFG. CO., Inc.
Division of AMERICAN RADIATOR & Standard Sanitary Corporation
1425 WEST AVE. BUFFALO 13, N. Y.

Coffin-type Planimeter

THE Trill Indicator Company is now supplying a streamlined Coffin-type Planimeter, for determination of mean indicated pressure from engine indicator diagrams.



The instrument is simple to use, requires no technical training, eliminates all calculating. It is furnished standard with commonly-used pressure scales, and instructions, in a sturdy compact case. Complete particulars are given in Leaflet T-454 available from The Trill Indicator Company, 7000 Bennett St., Pittsburgh 8, Pa.

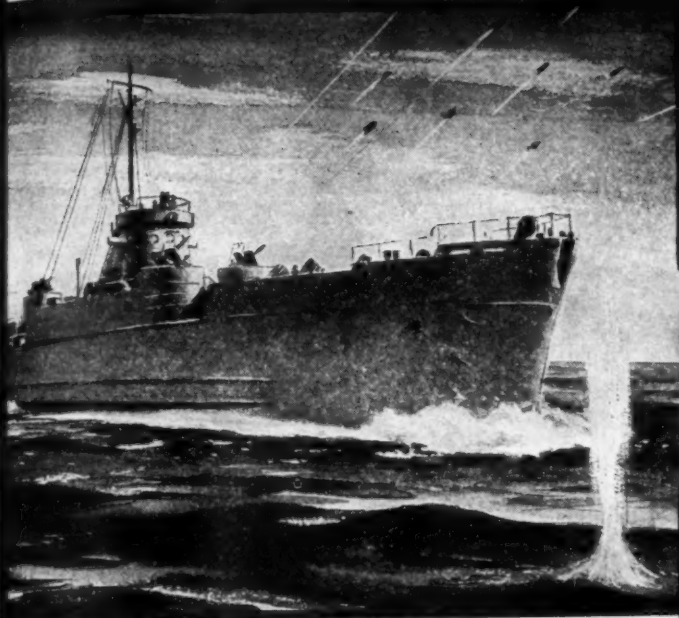
Adel Precision Products Elects President

WILLIAM A. DERIDDER has been elected president and general manager of Adel Precision Products Corp., Burbank, California, according to announcement made by Henry S. Wright, chairman of the board. He succeeds Ray Ellinwood, resigned.

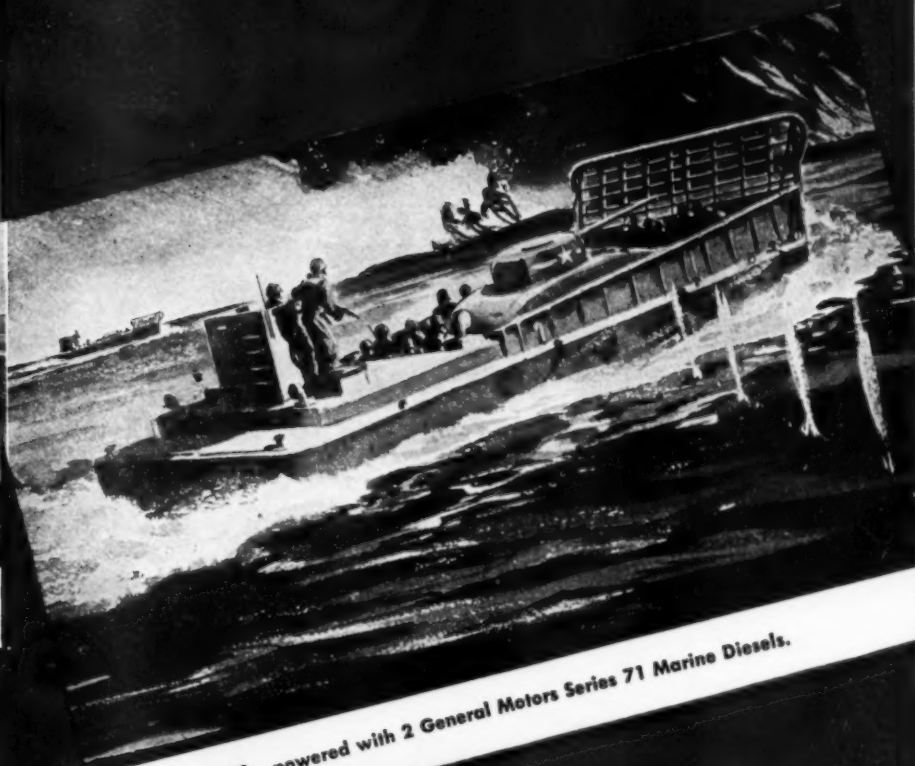


William A. DeRidder

Mr. DeRidder has been a director of Adel since January, 1943. In 1920, he joined predecessor companies of General Metals Corporation, Vernon, California, becoming president in 1937, a position which he will retain. Like Adel, the company is also owned by Transamerica Corporation.



LCI—powered with 2 quads—
8 General Motors Series 71 Marine Diesels.



LCM—powered with 2 General Motors Series 71 Marine Diesels.

Spearheads of the attack — all powered by GM Diesels

GM

GENERAL MOTORS

DIESEL POWER

Thousands of American marines and soldiers pour ashore on world-wide battle fronts carrying the conflict to the very front doors of the enemy. In the forefront are countless landing craft like those illustrated here — landing craft powered by General Motors 2-cycle Marine Diesel engines. In addition GM Diesel engines of from two to six cylinders are used when needed for auxiliary power.

The records of these famous boats reveal the performance of their engines.

As of July 1st, 167,046 of the GM Series 71 Engines have gone to war in a wide variety of uses. The engineering and operating experience gained in this gigantic task is available NOW to apply this engine to commercial uses.

SINGLE ENGINES... Up to 200 H.P. } • • DETROIT DIESEL ENGINE DIVISION, Detroit 23, Mich.
MULTIPLE UNITS... Up to 800 H.P. }

ENGINES... 150 to 2000 H. P. ... CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, Ohio

LOCOMOTIVES... ELECTRO-MOTIVE DIVISION, La Grange, Ill.

China Needs American Railway Equipment



TEN members of the Chinese railway mission and two Alco officials are shown aboard an Alco-G.E. 1,900 horsepower Diesel-electric road switcher on the formers' visit to the two Schenectady plants.

E. S. Mao, head of the mission (third from right), told local officials that China has lost 90 per cent of her railroads and hundreds of locomotives to the Japs and that China must look to America, her best friend, for continued help and sympathy during her rehabilitation and reconstruction.

Shown left to right are: Ying-Ping Wang, Fatuan Li, Fenrie Wong, M. L. Loh, Hai-Ping Chang, Tseh-Chuan New, En-tao Shen, Mao-Lsun Koo, C. C. Wang, Mr. Mao, Manuel Alonzo, Alco's foreign sales representative, and Carl Dinic, assistant to the president of Alco.

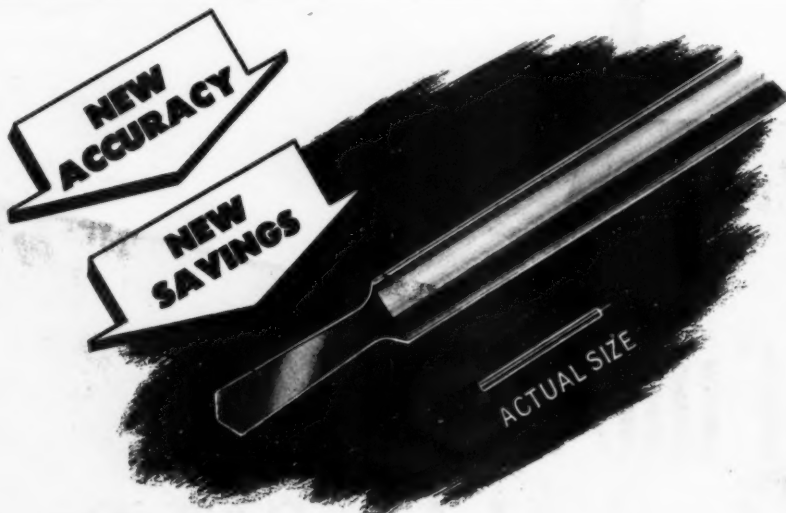
American Locomotive Appoints Gus Sample

THE American Locomotive Company announces the appointment of Gus H. Sample as Technical Assistant to the Director of Engineering, Diesel Division. Mr. Sample will be located at Schenectady, New York. Mr. Sample is a graduate of Washington University with a B.S. degree in Mechanical Engineering. He is a member of the Advisory Board of the University of Washington Engineering School.



Gus Sample

From 1930 to 1932 Mr. Sample was Draftsman and Designing Engineer with the Busch Sulzer Company at St. Louis, Missouri. He spent from 1932 to 1934 in the field installing and operating Diesel engines on large dredging operations. In December, 1934 he went to the Fairbanks, Morse and Company Diesel engine plant in Beloit, Wisconsin, working for the U. S. Navy Bureau of Engineering as Senior Inspector, and later as Associate Mechanical Engineer, taking entire charge of the Navy Inspectors in this plant. He resigned from the Bureau of Engineering in 1937 and then rejoined the Busch Sulzer organization. Here he was Executive Engineer in charge of the engineering in connection with installations for the Maritime Commission and various naval vessels. He also was assistant to the General Manager of this plant and had full jurisdiction of all inspection, as well as engineering, which position he held until his present appointment.



in Diesel Engine Performance

Accuracy in size, length, straightness and positioning of the microscopic spray orifices in Diesel injection nozzles is a governing factor in Diesel engine efficiency. Manufacturers are now securing and safeguarding this accuracy by using super-accurate Najet precision micro-drills.

These microscopic tools, obtainable in a full range of one ten-thousandth inch sizes, are held to the almost unbelievable plus or minus tolerances of .0001". Yet Najet micro-drills are so tough that they give long drilling service on hardest alloys—as many as 300 to 600 holes in spring steel per drill and even higher are reported.

This long service, plus the extreme accuracy of the drilling, with its reduction in reaming operations, produce very appreciable savings.

Najet micro-drills also make possible successful salvage of used injector nozzles, except where clogged with wire or unduly enlarged from use.

NAJET DRILLING SERVICE

For manufacturers who lack facilities for micro-drilling we handle both original and salvage drilling operations at economical cost. Write for full information.

"The Only Business Of This Kind In The World"



National Jet Company

115 MILTON PLACE

CUMBERLAND

MARYLAND

They help make the going easier...

ALCOA ALUMINUM OIL-COOLED PISTONS

DIRECTED-FLO

"COCKTAIL SHAKER" TYPE

SPRAY-COOLED

Supercharging and higher engine output have added to the heat load which pistons, cylinder heads and liners have to carry. You can help that situation with oil-cooled aluminum pistons. The general reduction of temperature levels thus obtained eliminates piston ring sticking and reduces wear on rings and liners.

Alcoa supplies three types of oil-cooled pistons: Spray-cooled, the slosh-cooled or "cocktail shaker" type, and those cooled by directed-flow of the oil. Of course, all have the advantage that, made of aluminum, heat is distributed more uniformly throughout their mass.

Operating characteristics of an engine determine the type of cooling which should be used. Alcoa engineers will gladly help you with this problem. Write ALUMINUM COMPANY OF AMERICA, 2141 Gulf Building, Pittsburgh 19, Penna.

ALCOA FIRST IN ALUMINUM



RELIABLE... readable

**EVEN IN THESE
*Rough Places***



are ALL-METAL for ALL-ROUND ruggedness!

In tough spots like these, and many others too, *Weston All-Metal Industrial Thermometers* withstand shaking up without breaking down. Even the severe vibrations of pumping units or Diesel engines do not affect the long-term stability of Weston Thermometers.

Basic to their *all-round ruggedness* is an all-metal construction that insures sustained accuracy (within 1% full-scale) over long periods of time. There are no liquids, gases, capillaries or other troublesome parts. Simply an all-metal temperature element safely sheathed in a rugged stainless steel stem.

Weston All-Metal Thermometers are available in scale lengths 6", 9", 12" . . . stem lengths from 2½" to 48" . . . ranges from -100°F to +1000°F. Literature gladly sent on request . . . Weston Electrical Instrument Corporation, 579 Frelinghuysen Avenue, Newark 5, New Jersey.



Weston *All Metal* THERMOMETERS

Standard of California Wins Signal Safety Award

STANDARD of California recently became the first industrial concern in the United States to win four awards from the National Safety Council for "distinguished service to safety."

The record was achieved with the delivery of a safety award to officers and crews of the company's tanker fleet. This in itself was the first such award made to any western oil company. The certificate and "S" pennant were presented to J. L. Hanna, vice president in charge of Standard's marine operations, by Earl Campbell, western regional director of the council.



Award for safety on the high seas: Pictured left to right—R. L. Donovan, chief safety engineer, Standard Industrial Relations department; Earl Campbell, western regional director, National Safety Council; J. L. Hanna, Standard vice president in charge of marine operations; J. H. McEachern, manager Standard's marine department; A. E. Kihn, assistant manager marine department; and G. D. Washburn, Standard safety engineer.

Standard's 1944 accident rate in its ocean and coastwise tanker operations was 16.7 per cent below 1943 and was 46 per cent below the national average. The company's accident severity rate was 85.2 per cent below 1943 and 71.6 per cent below the national average.

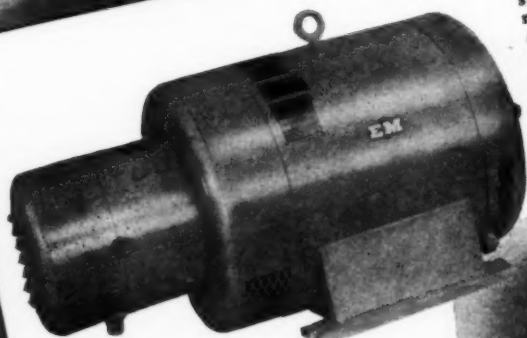
New Vortex Catalogs on Oil-Bath Air Cleaners

THE Vortex Company has recently issued new catalogs on its Types G & GA and Types S & SA Triple Action Air Cleaners. Besides detailed specifications and dimensions on all models and accessories, the catalogs contain full data on selection of the proper size cleaner for internal combustion engines and air compressors. Illustrations and diagrams covering design, operation and construction make these new catalogs easy to use; separate price sheets on complete units, as well as parts and accessories, are provided to fit into each catalog between specification pages. Copies may be secured by addressing Vortex Company, Detroit, Michigan; Dallas, Texas; or Claremont, California.

IT'S EASY to pick the best A-C GENERATOR FOR POWER PLANTS

Type R

• 3.75 to 18.7 kva; speeds 500 to 1800 rpm; standard voltages. A compact a-c generator for coupled or belted duty with diesel or gas engines. Drip-proof protected; prelubricated ball bearings requiring no service for several years. Dynamically balanced rotor. Direct-connected exciter.



ENGINE MANUFACTURERS AND GENERATOR-SET ASSEMBLERS FIND E-M'S 5-POINT FEATURES MEAN BETTER A-C GENERATOR SETS!

Type S

• 18.7 to 125 kva; 500 to 1800 rpm; standard voltages. Available with belted exciter or direct-connected. Matched for diesel or gas-engine drives. Drip proof protected for maximum service. Rotor is dynamically balanced; ball bearings standard. Has highest quality insulation.

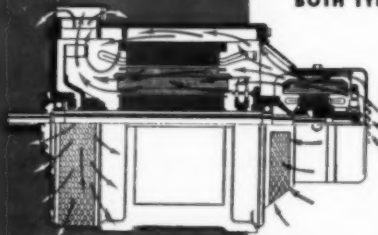


NO "MAGIC" is needed to select the right generator to meet your a-c power plant demands. Simply use the five-point check list below and ask: "Does this generator have . . ."

- 1 **DOUBLE PROTECTION?**—Drip-proof protection from falling liquids and particles, plus screened ventilating openings for added safety? *E-M Generators Have It!*
- 2 **"POL-AIRE" VENTILATION?**—Controlled, fan-pulled cool air through the generator? *E-M Generators Have It!* *(See cross-section drawing at right).
- 3 **CORRECT INSULATION?**—Stator coils and field windings that are protected by moisture-resistant, permanently pliable insulation with high dielectric strength? *E-M Generators Have It!*
- 4 **ANTI-FRICTION BEARINGS?**—Highest grade ball bearings that mean long life and smooth generator operation? *E-M Generators Have It!*
- 5 **LIBERAL DESIGN?**—A design that's based on nearly half a century of cumulative experience in building and applying a-c generators correctly? *E-M Generators Have It!*

WRITE TODAY for Publication 177 describing these high speed bracket type a-c generators for power plants.

BOTH TYPES HAVE "POL-AIRE" VENTILATION!



*Sturdy fan, dynamically balanced, pulls cool air through generator. Ventilating air is drawn through large screened openings and louvers in exciter cover, then forced through unrestricted air passages to ventilate field poles and core. Air is discharged on engine side; forms heat-resisting buffer. Assures cool-running, efficient operation.

ELECTRIC MACHINERY MFG. COMPANY

Good Engines Deserve

MINNEAPOLIS 13, MINNESOTA

E-M

GENERATORS



Specialists in Synchronous Generators Since 1903

A2016

DeLuxe Clinics Feature New Charts on Oil and Filter Fundamentals



ANNOUNCEMENT of the publication of a series of four full color wall charts picturizing the fundamentals of oil cleansing and cartridge diagnosis was made recently by H. A. Lightner, President, DeLuxe Products Corp.

"These charts," Mr. Lightner states, "are the result of the widespread interest evidenced on the part of fleet operators, engine builders and service men in the basic principles involved in oil cleansing as they have been presented to S.A.E. Meetings, dealer and automotive service

men's clinics throughout the country by our Vice President in Charge of Sales, Cecil Bentley.

"Under the auspices of DeLuxe Jobbers and Truck, Tractor and Bus manufacturers, these charts are now being shown to distributors, mechanics and service divisions as a part of the DeLuxe Lubrication and Filtration Clinic meetings.

"The charts mark a major contribution to the Oil Filter Industry. Combined in these charts are the scientific findings of years of petroleum research and those of DeLuxe technicians both in the field and laboratory.

"Chart Number One covers the subject of 'Oil and Oil Cleansing Principles.' The Subject of Chart Number Two is 'Oil and Cartridge Diagnosis.' 'The Importance of the Cartridge' is the subject of the third chart."

H. J. Kinkade Joins Young Radiator



H. J. Kinkade

YOUNG Radiator Company announces that H. J. Kinkade is now a member of the Young Contract Product Division staff. In this new connection Kinkade will handle special work on evaporative cooling and similar type equipment for large engine installations. He is especially equipped for this work both by education and experience. Since acquiring his B.S. in M.E. from the University of Missouri, in 1925, Kinkade has been prominently associated with the heat transfer industry in both air conditioning and on large internal combustion engine cooling installations. He was formerly manager of evaporative cooler sales for Fairbanks Morse Co.

• BUCKEYE DIESELS •

Always

DEPENDABLE

"BE PROFIT-WISE
AND DIESELIZE WITH BUCKEYES".

NAVIGATORS know that a compass is **DEPENDABLE** for guidance. North is always **NORTH**.

Buckeye Diesels give their owners that kind of dependability, too. The name "Buckeye" on an engine has been the symbol of **DEPENDABLE POWER** ever since 1908—*always* a proved guide to **DIESEL ECONOMY**.

Every feature of Buckeye design and construction has been developed to bring greater dependability and economy to users of Diesel power. For example: No bolts, studs, cap

screws or gaskets are used to secure the exhaust and air manifolds to the cylinder heads. This is an exclusive Buckeye feature which, by making cylinder heads easily removable, eliminates valve cages. As a result, valve areas are larger and combustion efficiency is increased by providing unrestricted air flow and quicker expulsion of gases.

Stationary and Marine Propulsion (Direct reversing)
Engines 150-1440 H.P.
Marine Auxiliary and Stationary Generator Sets
100-1000KW.

WRITE TODAY for your Buckeye bulletins. Place your order **NOW** for early delivery.

*Supercharged Ratings

THE BUCKEYE MACHINE COMPANY - LIMA OHIO
• ENGINE BUILDERS SINCE 1908 •

A COMPOSITE CATALOG OF THE ENTIRE DIESEL INDUSTRY

Alco Diesels for Universal Application
Alco Stationary Diesels
Alco Sulzer Diesels
Anderson Model ED
Atlas Imperial Stationary Diesels
Atlas Imperial Industrial Diesels
Atlas Imperial Marine Diesels

Atlas L-Series Diesels
Baldwin Model VG Diesels
Baldwin Model VO and VM Diesels
Baldwin Series 10 Diesels
Buckeye Model "70" Diesels
Buckeye Series "80" and "90" Diesels
Buda-Lanova General Purpose Diesels
Busch-Sulzer Bros. 2-cycle Diesels
Busch-Sulzer Bros. 4-cycle Diesels
Caterpillar Automotive Diesels
Caterpillar Industrial Diesels
Caterpillar Marine Diesels
Chicago Pneumatic Models 8 and 9 CP
Chicago Pneumatic Type 16-CP
Chicago Pneumatic Type 112
and 114 CP

Chrysler Industrial Diesels
Chrysler Marine Diesels
Clark Bros. Convertible Gas Diesels
Clark Bros. Models SD and MD
Cleveland Diesel Div. G.M.
Models 268A and 278A
Climax Models D 148 and D 297
Cooper-Bessemer Types GS, FV and EN

Cooper-Bessemer Type JS
Cooper-Bessemer Type LS
Cummins Model A Diesel
Cummins Model H and HS
Cummins Model L and N
Cummins Fuel Injection System
Detroit Diesel Div. G.M. Series
71 Diesels
Dodge Lanova Diesel
Electro-Motive Div. G.M. Model 567
Enterprise Standard & Supercharged Diesels

Fairbanks-Morse Model 38,
"OP" Diesel
Fairbanks-Morse 2-cycle
Types 33 and 37
Fairbanks-Morse 2-cycle Model 32
Fairbanks-Morse 2-cycle Model 35
Fairbanks-Morse 4-cycle Model 36
Fulton Iron Works Co.
Models RR, BGS and KS
Gray Marine Diesels
Hallett Diesels
Hamilton Double Acting Diesels
Hamilton Single Acting Diesels
Joshua Hendy Series 50 and
20 Diesels
Hercules Automotive Diesels
Hill Model R. Diesels
Ingersoll-Rand Type "S"

International Tractor and
Industrial Types
Kahlenberg Marine and
Stationary Diesels
Kermath 4-cycle Marine Conversions
Lathrop Types D-50 and D-80
Lister-Blackstone Models CD and CE
Lorimer Slow Speed Heavy
Duty Diesels
Mack-Lanova Trucks, Bus and Marine
Murphy Marine Diesels
Murphy ME Series Diesels
Nordberg Convertible Diesel-Gas
Engines
Nordberg 2-cycle Diesels
Palmer Bros. Type RND
Rathbun-Jones Diesel and
Gas Engines
John Reiner Diesel Marine
Auxiliary Units
Sheppard Models 6 and 7, 12 and 13
Sterling Viking Diesels
Superior (National Supply Co.)
Models A and D
Superior (National Supply Co.)
Types M and S
Union Marine and Stationary Diesels
United States Motors
Diesel-Electric Plants
Venn-Severin Model HC
Venn-Severin Model HCV
Venn-Severin Model M
Washington Industrial and
Marine Diesels
Waukesha Hesselman Industrial Type
Waukesha Multi-fuel Oil Engines
Witte Diesels and Diesel
Electric Plants
Wolverine 2- and 4-cycle Diesels
Worthington 4-cycle Diesels

Worthington Models BB, CC,
DD, DH, EE and EH

Equipment Described

Adeco Fuel Injection Equipment
American Bosch Fuel Injection
Equipment
Demco Fuel Injection Equipment
Bendix Scintilla Fuel Injection
Equipment
Ex-Cell-O Fuel Injection Equipment
American Blower Hydraulic Couplings
Durabla Pump Valve Service
Diamond Chain Drives
Link Belt Chain Drives, Couplings,
Speed Increasers
Morse Chain Drives and Couplings
Roots Connersville Supercharging
Blowers
B-W, formerly McCulloch, Roots-Type
Superchargers
Elliott (Buchi System) Turbochargers
Elliott Electromagnetic Slip Couplings

More than **300**
American-made
Diesels described
PROFUSELY ILLUSTRATED



USE THIS COUPON

DIESEL ENGINES, INC.—Two West Forty-Fifth Street—New York 19, N. Y.

Enter my order today for a copy of the New Diesel Engine Catalog, Volume Ten, Edited by Rex W. Wadman, for which I enclose \$10.00.

NAME:

ADDRESS:

CITY

ZONE NUMBER

STATE

PLEASE PRINT NAME AND ADDRESS

Weatherhead Engineers Advanced

APPOINTMENT of J. F. Campbell as Chief Development Engineer and R. W. Phillips as Laboratory Director was recently announced by N. Paquin, Director of Engineering for The Weatherhead Company. Mr. Campbell came to Weatherhead early this year from the Holley Carburetor Company, Detroit, where he was Director and Chief Engineer of the Fuel Injection Division. Before that, he was employed by the Army Air Force, stationed at Wright

Field for eleven years. Here he experimented and pioneered the development of fuel injection equipment and automatic controls for aircraft.

As Weatherhead's Chief Development engineer, Mr. Campbell will conduct the Weatherhead development program, continuing along present plans and introducing new experimental work. He will be assisted in the execution of this program by Ralph Erskine of the development engineering staff.

Mr. Phillips joined the company's engineering staff in 1941 and was placed in charge of the hose division. In his new position, he will direct operation of the entire Weatherhead laboratory and will be assisted by Robert Pac.

Baldwin Locomotive To Open Paris Office

THE Baldwin Locomotive Works will open a headquarters in Paris in September to provide "on-the-spot" coverage for Baldwin's heavy machinery in France and its colonies, Belgium, and Holland, Ralph Kelly, president, recently announced.

Named to direct the new office is Thomas Butts, native of Whitehall, Pa., with degrees in mechanical engineering from Lehigh University and in economics from the Sorbonne (University of Paris). Holder of the French Legion of Honor and several other decorations as a result of his brilliant record as a fighter pilot in World War I, he also distinguished himself as a business specialist in American embassies at Paris, Berlin and Brussels and more recently in vital war production activities with the U. S. Government.



Thomas Butts

In announcing the move, Kelly said: "Since European manufacturers, notably those in France, will be unable for a number of years to meet even their own domestic manufacturing needs—and since Germany has ceased to exist as a major factor in machinery production, we feel there'll be continuing demand for heavy American machinery for a long time." Baldwin currently has in production 260 locomotives ordered by the French, but also manufactures a wide variety of heavy industrial machinery including hydraulic presses, Diesel engines, hydraulic turbines and other items needed in postwar industrial expansion.

In
73 Years
We Have
Learned a
Lot



For more than 73 years The Chicago Screw Company has maintained its leadership in meeting the exacting demands of many and varied industries. Our experience, gained in making millions of Precision Screw Machine Products is at your command—now.

We can produce any of your special screw machine parts in any size from $\frac{1}{8}$ " diameter to 5" diameter in any type of raw material.

Our facilities are most complete and include all modern methods of heat treating and hardening, plus secondary machining operations such as Milling, Drilling, Boring, Broaching, Grinding of any type—precision Thread Rolling and Grinding, Hydrogen Brazing, Electronic Heating, etc.

In your present plans for post-war products—try "Chicago Screw"—manufacturers of precision-made Screw Machine Products.



THE CHICAGO SCREW CO.
1026 So. Homan Avenue Chicago 24, Ill.



engineering
large of the
on, he will
Weatherhead
Robert Pae.

will open a
to provide
vin's heavy
es, Belgium.
nt, recently

Thomas Butts,
rees in me-
University
ne (Univer-
h Legion of
s as a result
er pilot in
d himself as
embassies at
ore recently
s with the

said: "Since
y those in
ber of years
manufactur-
as ceased to
ery produc-
demand for
long time."
on 260 loco-
t also manu-
industrial ma-
s, Diesel en-
other items
nsion.

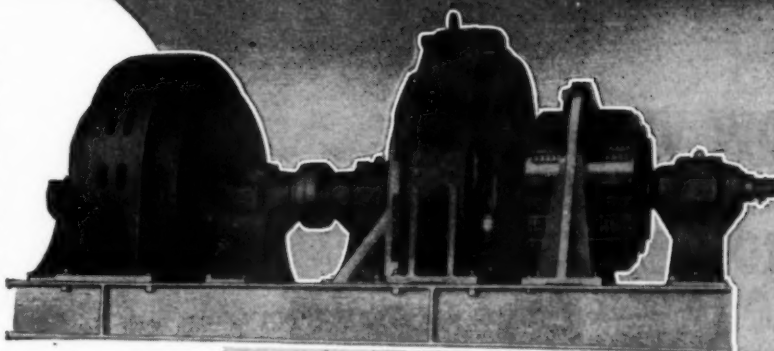


BURKE for 54 years a builder of motors and generators in a wide range of types and sizes has the specialized experience to combine these units in M-G Sets to meet any current demand to 1000 K. W.

In addition to a standard line of M-G Sets both Synchronous and Induction motor driven, Burke also builds special combinations of A. C. to A. C.; D. C. to A. C.; or D. C. to D. C. Motor Generator Sets.

As each motor, generator application varies to meet individual sets of conditions it is good business to consult a specialist. Send your M-G problem to Burke.

BURKE ELECTRIC COMPANY
ERIE, PENNSYLVANIA



Burke 1000 K. W. Motor Generator Set. 720 R. P. M.
Synchronous Motor Driven.

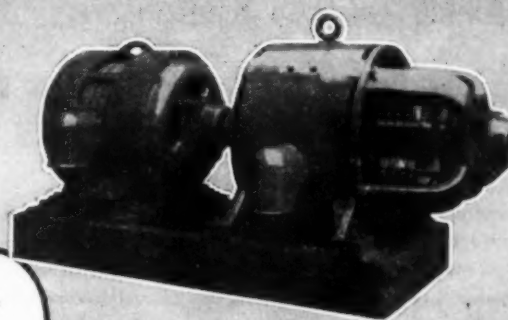


Burke 180 Cycle
50 K.V.A.; A.C. to A.C.
M-G Set

BURKE PIONEERED THE HIGH CYCLE M-G SET

to furnish high frequency power with exceptionally good voltage characteristics for driving high speed tools. These sets are standardized in 6.25; 12.5; 25; 40; 50; 62.5; 75 and 93.8 K.V. A. Larger sizes built to special order.

Write Dept. 558 for booklet No. 400.



Burke 75 K.W. Motor Generator Set. 1200 R. P. M.
Induction Motor Driven.



Burke 15 K.W. Motor Generator Set. 1800 R. P. M.
D. C. Motor Driven.



MOTORS 1 TO 1500 H. P. • GENERATORS 1 TO 1000 K. W.

BURKE A.C. & D.C. Motors & Generators

BURKE ELECTRIC COMPANY, ERIE, PENNSYLVANIA • SINCE 1891

Felt Products Issues New Enlarged Material Sample

JUST off the press is the new Fel-Pro Material Sample Folder No. 41-A, issued by Felt Products Mfg. Co. This folder contains 52 actual samples of gasket and packing materials, an increase of 50% over the previous edition it replaces. In addition to the samples, there are descriptions of each material, recommendations for their uses, and technical data as to thickness, finish, etc. Among materials shown are many treated in various ways—such as thiokol-

izing, coating, processing, laminating, vulcanizing, etc.—to meet special sealing conditions. Other Fel-Pro materials shown in the folder find increasing application in the radio and electronic fields, and for sound and vibration dampening. In short, Felt Products Mfg. Co. claims materials for anything in packing and gasket line from the tiniest washer to the largest Diesel Engine head gasket.

Byron J. Schwinn, Manager of Felt's Industrial and Automotive Division, says: "Hundreds of

requests have already come in for this folder, which we feel is indicative of the great interest in new gasket and packing materials developed to meet post-war and reconversion requirements." Copies of the new Fel-Pro material sample folder No. 41-A may be obtained by writing directly to Felt Products Mfg. Co., 1522 Carroll Ave., Chicago 7, Illinois.

HOW VIBRATION TRANSMISSION FROM ENGINES MOUNTED ON CONCRETE FOUNDATIONS IS STOPPED . . . with KORFUND VIBRATION CONTROL

The sectional drawing shows an outstanding method, developed by The Korfund Company, of isolating Diesel engine vibration.

The engine is mounted on a concrete foundation in which is embedded a structural steel chassis. The projecting ends of the chassis are bolted to Korfund Steel Spring Vibro Isolators placed in pockets in the surrounding sub-base.

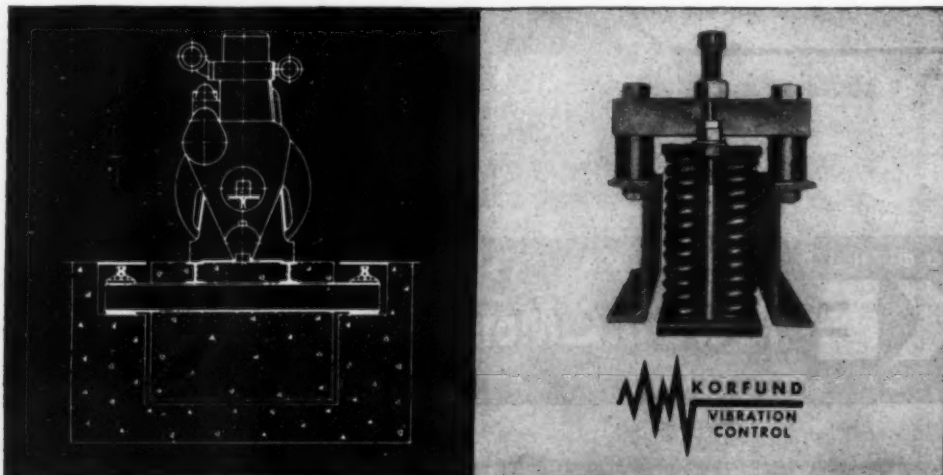
The entire weight of engine and foundation is resiliently suspended on the isolator springs. Hence all the dynamic forces arising

from the operation of the engine are checked before they can be transmitted to the building foundation or adjacent equipment.

This is only one example of Korfund Vibration Control. Each application is considered as a separate problem. Solutions are based on more than forty years of experience.

Write for full information

THE KORFUND COMPANY, Inc.
48-28 Thirty-second Place
Long Island City 1, N. Y.
Representatives in Principal Cities

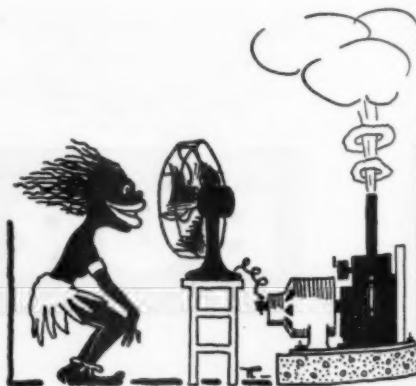


Ancient and Modern Blowers



Pictured above are two Roots-Connorsville Blowers built a long way apart.

THE young lady has her right hand on an early type, known as the "turtle back," which was built about 1875. To her left is a current model driven by a lightweight gas engine, this unit having been developed for the Army Air Forces for use in field service to salvage crashed planes. The unit is readily portable and is used to inflate large bags, or "pillows," which serve as pneumatic jacks in salvaging operations. Roots-Connorsville Blower Corp. has been engaged practically 100% in war work since early 1942, and was making supercharging blowers for Navy Diesel engines as early as 1939.



for this folder,
great interest
als developed
ion require
Pro material
obtained by
fig. Co., 1522

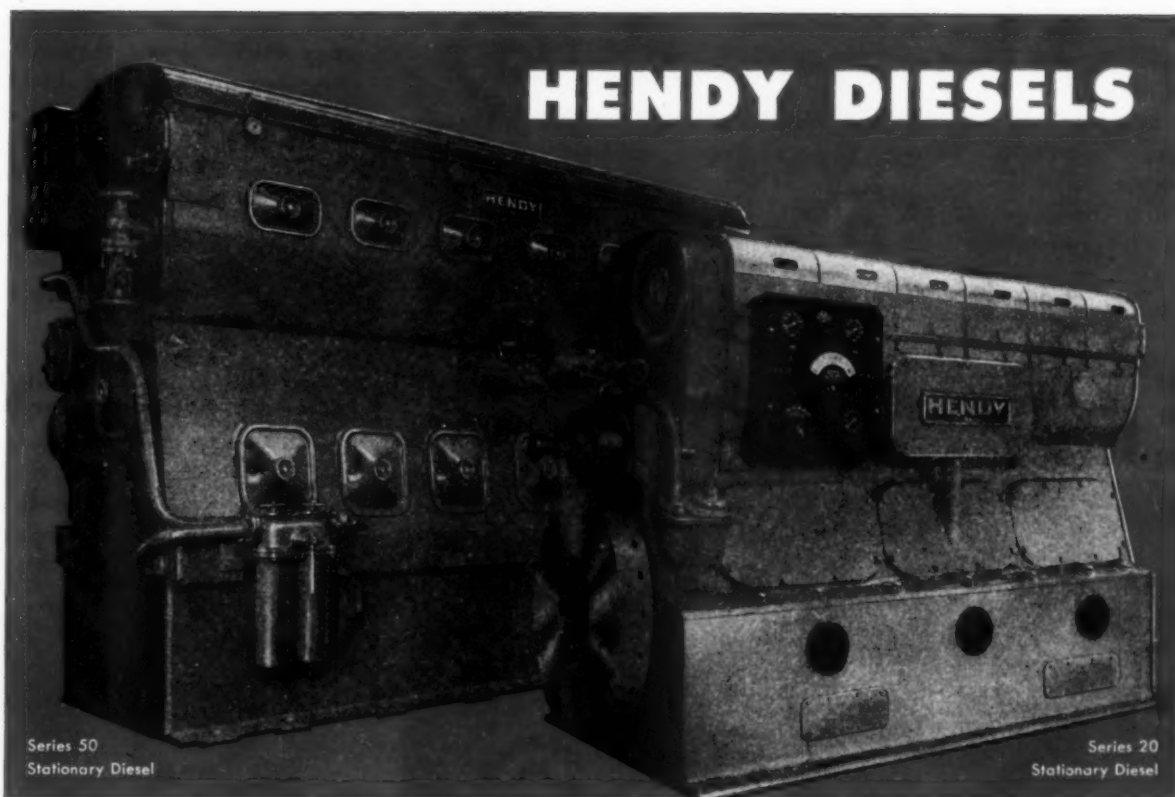
wers

Connersville
part.

hand on an
back," which
is a current
engine, this
the Army Air
vage crashed
able and is
ows," which
aging opera-
Corp. has
n war work
percharging
as early as



EL PROGRESS



Series 50
Stationary Diesel

Series 20
Stationary Diesel

HENDY DIESELS

now available from 125 to 780 horsepower

Industrial operators are finding that in Hendy Diesels there is *more* than meets the eye. Besides their clean-cut appearance, they embody many features never before available in any one engine.

DEPENDABILITY: Unit-type fuel pumps and injectors eliminate high-pressure fuel lines and danger of air-locks. Overhead camshafts eliminate many moving parts and give quiet, reliable valve and fuel-pump action. Full pressure lubrication to moving parts assures the correct amount of oil at the right places, automatically.

ACCESSIBILITY: Fuel-transfer, lubricating-oil and cooling-water pumps, oil coolers, fuel and lube-oil filters are *conveniently* located and instantly accessible. Large inspection-doors, which can be removed without disturbing any other assemblies, give easy access to crankshaft and connecting-rod bearings.

LONGER LIFE: The conservative ratings and heavy-duty characteristics of these engines assure long life and smooth operation. The crankshaft, which is large and well proportioned, is supported by large, replaceable, bronze-backed bearings, all of which receive positive pressure lubrication.

GENERAL SPECIFICATIONS

SERIES 20

125 to 260 hp; 600 - 900 rpm; Air starting.

SERIES 50

350 to 780 hp; 350 - 500 rpm; Air starting; Dual intake and exhaust valves.

OPTIONAL EQUIPMENT

includes: Clutch power take-offs from either end; Engine-driven starting-air compressor; Closed-circuit cooling system.

Also available as complete generating plants.

Send coupon today for complete information and name of nearest Hendy representative. No obligation. Joshua Hendy Iron Works, Sunnyvale, California.

JOSHUA HENDY IRON WORKS
ESTABLISHED 1856
SUNNYVALE, CALIFORNIA



JOSHUA HENDY IRON WORKS
SUNNYVALE, CALIFORNIA

Please send illustrated catalog on Hendy Diesel engines.
I am interested in engines up to 300 hp ☐ over 300
hp ☐ Diesel electric generating plants up to 225 kw ☐
over 225 kw ☐.

Name

Company

Street

City Zone State

96-D-19

Winding Up War Contracts

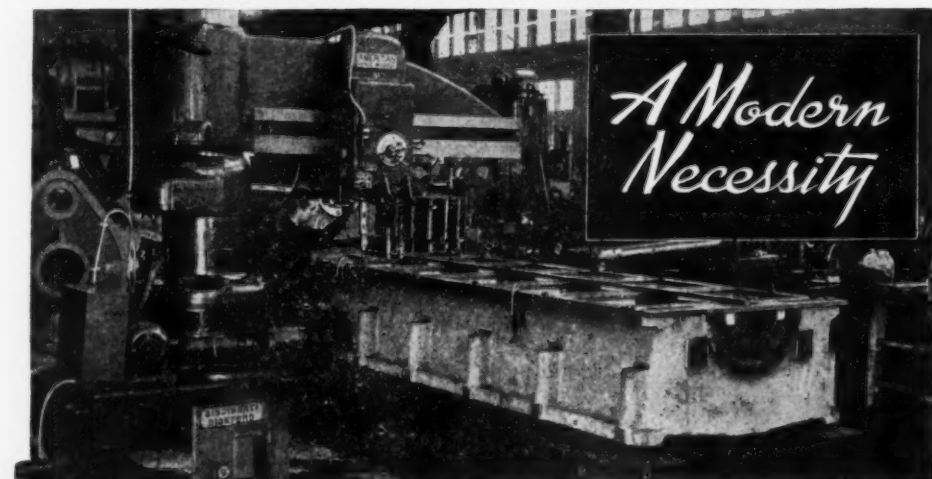
URGED by officials of the Office of Contract Settlement, McGraw-Hill Book Company has brought out a book entitled "How to Speed Up Settlement of Your Terminated War Contract." The object is to tell the average American businessman the way in which he may handle his plant operations when he receives notice of the termination of his war contracts. The author of the book is J. K. Lasser, author of the

popular manual "Your Income Tax," who has an enviable reputation for his ability to present such matters in a simple, untechnical manner.

The book contains a complete statement of all the laws, rules, regulations, forms, reports, and other government data issued to this date on the subject of termination. Much of it has been boiled down into a series of check lists that tell the large and small contractor how to

proceed and how to get maximum protection in his dealings with government officials. Besides listing all the different varieties of red tape which have to be unwound Mr. Lasser supplies many hints on what contractors and subcontractors should be thinking about before and after receipt of a notice of termination, how a settlement is negotiated, how to determine what costs may be claimed, how government determinations may be appealed, and very weighty information and advice on numerous other points. The book is priced at \$3.50.

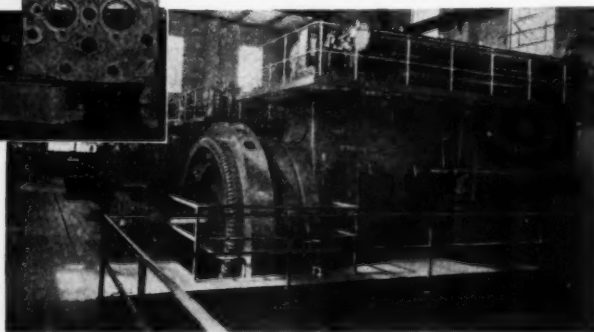
INTERCHANGEABILITY



Long ago, we here at Fulton, recognized the meaning of interchangeability of parts and we tooled our production of Fulton Diesels to give our users this outstanding maintenance economy. Jigs and fixtures are applied to every possible machining operation to produce uniform parts, an exceptionally well co-ordinated engine and to permit replacement with the minimum of time and expense. That is another reason why Fulton Diesels all over the country are turning in remarkably low operating and maintenance cost records.

1852 Successful Engine Builders For 93 Years 1945

Top: Large base plate of Fulton Model BGS Diesel with drilling jig clamped in place. Above: View showing fixture for machining Model BGS cylinder heads. Right: Four large Fulton Diesels installed in the Algona, Iowa, municipal power plant.



FULTON IRON WORKS CO.
ST. LOUIS • MISSOURI

New Sales Appointments By Allis-Chalmers Tractor Division

SEVERAL new appointments to key positions in the Allis-Chalmers Tractor Division sales organization have been announced by W. A. Roberts, Vice President of the company and Manager of the Tractor Division.



Marshal L. Noel

Marshal L. Noel, previously Industrial Sales Manager and long identified with the company's crawler tractor and road machinery sales, is appointed General Sales Manager of the Tractor Division.

Ernest Franks has been placed in charge of Wheel Tractor Sales for Industrial purposes, in addition to his former duties as Manager of Power Unit Sales. Boyd S. Oberlink, until recently an Assistant Industrial Sales Manager, is appointed Assistant to the Vice President, Tractor Division.



n protection
officials. Be
eties of red
Mr. Laser
tractors and
about before
termination.
ow to deter
how govern
pealed, and
e on numer
ed at \$3.50.

By
Division

key positions
division sales
d by W. A.
company and

ustrial Sales
h the com
machinery
Manager of

n charge of
al purposes
as Manager
erlink, until
es Manager
e President.

EL PROGRES

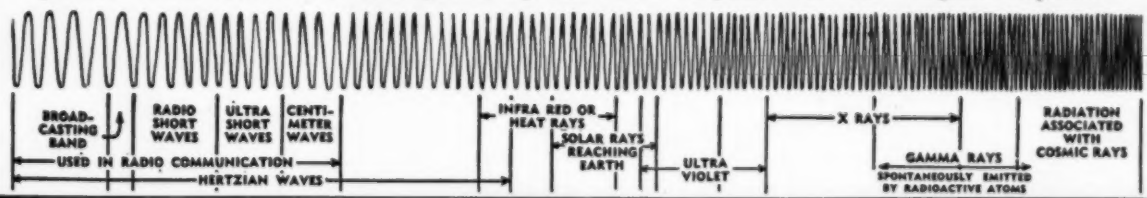
Shhhhhh!
...we can only whisper
about it now...

*But some day we can
tell you how good
Commercial Iron
Works is in installing
and repairing radar!*



CIW has the "Know How" in all Electronic Frequencies Including Radar!

The chart below shows the component parts of the ether spectrum, from the lowest to the highest frequencies. Commercial Iron's knowledge and experience runs the gamut from low to highest frequencies.



Right now, Uncle Sam, for very good reason of military security, keeps us modest. But this we can tell you:

Since the advent of war and the rapid development of radar and electronic devices, Commercial Iron Works' already well staffed and equipped electrical engineering and production departments have become recognized as the Pacific Northwest's finest in servicing, installing and repairing radar,

radio and electrical equipment—every type of electronic device now in use on Uncle Sam's fighting ships. The excellence of their work has been recognized by top Navy inspectors.

This is just another example of the "know how" that Commercial Iron has developed during the war to serve industry after the war. CIW is staffed and equipped to go to work for any industry where electrical equipment plays a part.

COMMERCIAL IRON WORKS PORTLAND, OREGON

CONTRACTORS • ENGINEERS • MACHINISTS • FOUNDERS • SHIPBUILDING • MARINE REPAIRS • DRYDOCKING

Changes in Norma-Hoffmann Sales Organization

NORMA-HOFFMANN Bearings Corporation (Stamford, Connecticut) announces a recent adjustment in the home office sales executive personnel, consequent upon the resignation of Carl W. Hedler as Western Sales Manager and Manager of Distributors' Sales. In line with the firm's established policy, which fosters the advancement of personnel from within its own organization, the following appointments became effective July 1st, 1945: R. L. Miller,

Sales Manager; E. M. Beers, Jr., Assistant Sales Manager; G. V. Titsworth, Assistant Sales Manager; C. L. Brown, Jr., Assistant to the Sales Manager; W. G. Sargent, Manager of Distributors' Sales. The foregoing sales executives will continue to report to Frederick W. Mesinger, Vice-President in Charge of Sales.

Army-Navy "E" Award to Patterson-Kelley Employees

ON May 22 the men and women of The Patterson-Kelley Company, Inc., designers and

manufacturers of heat exchangers, special re-compression and decompression tanks and oil coolers for the Navy, were awarded the Army-Navy "E." Ceremonies were held in the auditorium of the Junior High School with an attendance of approximately 400 of which 250 were employees and their families. The Master of Ceremonies was the Honorable Samuel E. Shull, President Judge of the 43rd Judicial District of Pennsylvania. Presentation of the award was made by Capt. R. L. Adams, USN. Presentation of the "E" pins to the employees was made by Lt. Col. R. C. Kratz, USA. A buffet supper was served later at the Shawnee Country Club, Shawnee-on-Delaware, Penna.

GETTING THINGS STARTED

AND FINISHED!



TOUGH construction jobs demand the rugged, dependable power of diesels. Getting the big jobs going and finished demands dependable starting. On many of these jobs the diesels are started electrically—at a touch of a button—by Globe Spinning-Power . . . the battery that has "proved" its reputation for outstanding performance in wartime replacement service. You'll get better service with Globe Batteries.

Write for complete information.

GLOBE-UNION INC., Milwaukee 1, Wisconsin

ATLANTA • BOSTON • CINCINNATI • DALLAS • KANSAS CITY • LOS ANGELES
MEMPHIS • MINNEAPOLIS • PHILADELPHIA • SEATTLE DP-845



Charles A. Butcher Joins Crocker-Wheeler

CHARLES A. BUTCHER, formerly Manager of the Pacific Coast Manufacturing and Repair Department of the Westinghouse Electric & Manufacturing Company, has recently been appointed Assistant General Manager of the Crocker-Wheeler Division, Joshua Hendy Iron Works. A Fellow Member of the American Institute of Electrical Engineers, Mr. Butcher is the author of several articles on automatic controls for power generation and on substation and distribution equipment. He is also the inventor of a number of devices and control systems related to automatic switch gear.



Charles A. Butcher

Mr. Butcher is a native of Des Moines, Iowa and graduated from Iowa State College with the degree of B.S. in Electrical Engineering.

BUY MORE BONDS



VIBRATION...



TORSIONAL & LINEAR . . .

The **COX VIBRATION RECORDER** is the American Torsiograph. It was developed as the result of years of experience in vibration research, and embodies the characteristics needed for maximum accuracy in vibration study.

It is particularly adapted to the study of torsional vibrations of crankshafts in slow-speed Diesel, gas and gasoline engines, as well as to those wherein higher speeds and higher frequencies are encountered; also, to the measurement of linear vibrations of machines and structures.

Conveniently portable, with the following exclusive features:

1. Three New Interchangeable Translators:
Torsional, Linear Inertia, Linear Contact
2. New Endless Steel Belts for Greater Service
3. New Reversible Drive
4. New Multiple Speed Power Unit
5. Cantilever Spring Drive for Inertia Unit
6. Transmitting Levers Unaffected by Centrifugal Force
7. Constant Chart Feed for any Selected Rate
8. "Fetherwate" Recording Stylus
9. Interval Timer and DC Converter

COX INSTRUMENTS specially designed for research and production inspection in the Diesel Industry are:

Engine Indicators, Direct Pressure & Electronic

Fuel Flow Meters

Magnetic Thickness Gauges

Rail Car Test Equipment

Electronic Vibration Indicators

Manometers, Grid & Micro

Brake Test Recorders

COMMERCIAL RESEARCH LABORATORIES, INC.

INSTRUMENT MANUFACTURERS

20 BARTLETT AVENUE
Detroit 3, U.S.A.

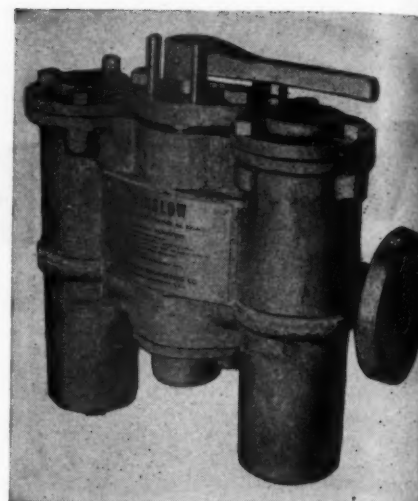
Established 1912

New Magnetic Strainer

COMBINING the effect of powerful permanent magnets with fine screening to remove filings and metal particles from oil systems or other liquids, the Winslow Engineering Company of Oakland, California, has recently developed an improved magnetic strainer which incorporates a number of new features.

Two cylindrical baskets consist of a main body of perforated steel, within which are fine wire mesh linings. The magnets are suspended

within these baskets. Of either cast bronze or iron, the one-piece body incorporates the manifold, strainers, inlet and outlet connections, by-pass valves, pressure regulator, and main control valve. The quick-acting hand-operated three-way control valve, simplified so as to require no jacks to lock it in place, permits change of flow from one strainer element to the other, or through both simultaneously. A safety factor is the fact that flow is maintained through either one or both strainers regardless of the position of the valve control



Winslow Duplex Basket Strainer

level. With flow directed through one basket the other basket and magnet assembly can be removed for cleaning as one unit. If necessary the magnet assembly can easily be detached from the basket for additional cleaning or inspection. Out-going pressure may be regulated by a valve adjacent to the three-way valve.

In addition to their use in the turbo-generator field, there are many other practical applications for this magnetic strainer, often in a more simplified form, in both industrial and marine fields. Among these are: Filtration of cutting oils used with machine tools; filtering oil used in large speed reducing or speed increasing gears; on run-in test-stands for gasoline, Diesel or steam power units to remove filings and metal cuttings during initial tests.

Outstanding American Scientific and Engineering Achievements During World War II

IN order to contribute to a better knowledge and appreciation of American scientific and engineering achievements throughout the English speaking world, the British Edition of "The Engineers' Digest" will publish in one of its monthly issues a series of articles on the most important American scientific and engineering developments during World War II. The full editorial contents of "The Engineers' Digest" will be devoted to technical articles of eminent American scientists and engineers dealing with recent American technological developments.

Contributions which will be treated strictly in accordance with their editorial merits, can be sent to the Managing Editor, "The Engineers' Digest," One Madison Avenue, New York 17, N. Y.

don't let sludge
ruin the engine



TO CLEAN OUT
THE ENGINE

Sludge, gum and acid are the greatest enemies to smooth performance and long life of engines. Present in all internal combustion engines they are certain to get in their dirty work unless checked and controlled.

Fortunately these petroleum residues can be controlled and rendered harmless easily and quickly with the use of LOOSITE and SILOO. For fifteen years these safe, swift working solvents have been helping to keep millions of engines in service at full efficiency. An initial LOOSITE treatment cleans the motor of sludge, gum and acids. Then SILOO added regularly with fresh crankcase oil keeps it clean. Lubrication flows freely—assuring long, economical and smooth operation of the engine.

It will pay you to get started with LOOSITE and SILOO today.

If you heat with oil—write for information on SILOO FUEL OIL TANK SOLVENT.



TO KEEP IT
CLEAN

Petroleum Solvents Corp., 331 Madison Ave., New York 17, N. Y.

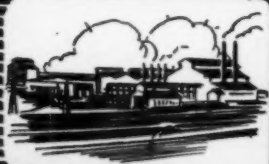
SHAFTING

By
ERIE

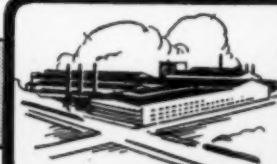
**SHIPS FOR
VICTORY**

Forgings . . .

• By the Erie Forge Company, finished for Diesel Crankshafts, Line Shafts and other forged parts, are driving the Nation's Ships for Victory . . . Forgings and Steel Castings are produced at Erie Forge Company under One Responsibility and with One Control . . . You can depend upon the Quality and Service which this complete control, from raw material to finished product, accords your requirements when you place them with us.



ERIE FORGE COMPANY, ERIE, PA.



90 YEARS EXPERIENCE

Where high efficiency, dependability, economical operation, and long life are major considerations, Diesel Engineers have long favored Roots-Connersville Supercharging and Scavenging Blowers. Ninety years of experience in successfully providing air supply for all manner of applications, operating conditions, and performance requirements is assurance that your supercharging and scavenging problems will be handled to best advantage with "R-C" Rotary Positive Displacement Blowers. They have the characteristics needed to achieve best engine performance at all practical operating speeds.

ROOTS-CONNERSVILLE BLOWER CORP.

One of the Dresser Industries
508 MIDLAND AVENUE
CONNERSVILLE, INDIANA



Supercharging and Scavenging
BLOWERS

Photo shows "R-C" Scavenging Blowers installed on two Diesels at the South Norwalk, Conn., Municipal Power plant. Capacity of each blower exceeds 13,000 CFM, 800 RPM, 2 1/4 lbs. pressure.



SIMS-WHITTINGTON CYCLONE *Silencer and Spark Arrester*

We offer no complicated graphs or tables in the selection of an S-W Silencer. Internal Combustion Engine builders have determined the proper size exhaust pipe in designing their engines. We start there. The Sims S-W Cyclone Silencer is built only in one style and 15 sizes from 1" through 18".

The exhaust gases make 3 reversals through progressively smaller passages and pass lazily into the atmosphere. Sound is throttled and solids



Write for Booklet

are removed.

We have simply refined an early Sims steam engine silencer that served on hundreds of well known engines so efficiently and economically. Navy and land power engineers will be interested in this sturdy and effective way to meet a vital need. Address inquiries to our

National Distributor:
**WHITTINGTON PUMP AND
ENGINEERING COMPANY**
227 South Meridian Street
Indianapolis 4, Indiana

SIMS HEAT RECOVERY EQUIPMENT

HEAT EXCHANGERS • EXHAUST GAS BOILERS • ENGINE SILENCERS • STORAGE WATER HEATERS • OIL HEATERS • OIL COOLERS • FEED WATER HEATERS AND UNIT TYPE PULVERIZERS

Detroit Diesel Appoints C. W. Patterson

ANNOUNCEMENT was recently made by V. C. Genn, Sales Manager of Detroit Diesel Engine Division, General Motors Corporation, of the appointment of C. W. Patterson as Sales Engineer. Patterson will make his headquarters in Tulsa, Okla., on the staff of Arch F. Campbell, manager of General Motors' Petroleum Industry Sales Dept.



C. W. Patterson

Patterson has been connected with Detroit Diesel's Engineering Dept. for several years and since 1942 has been a special service representative in the South Pacific. He was assigned to the Amphibian Engineers where his specific duties were to supervise maintenance of the series 71 G.M. Diesels in battle zones.

Paul Moore Joins Star as Motor Sales Manager



Paul J. Moore

APPOINTMENT of Paul J. Moore as Motor Sales Manager of Star Electric Motor Company, Bloomfield, N. J., has been announced by Ivor

M. Peter
Manager

Mr. Moon
Electric
the Gen
many ye
graduate
sity, Clas

DIESE
Editor

A COM
which ap
PROGR
cross ind
articles a
indexed l
for this
PROGR

Jay B.
Cummi
Colora

SALE of
mins Dic
to Jay B
ager in t
been ann
pany, Inc

Since 19
owned an
the name
Inc. Wi
Chamber
Cummins
Under th
organizat
modern
ver, whi
equipped
and a w

made by V.
Diesel En-
poration, of
on as Sales
headquar-
h F. Camp
Petroleum

M. Peterson, Vice President and General Sales Manager of the company.

Mr. Moore has been Sales Manager of Imperial Electric Co., Akron, since 1944 when he left the General Electric Co., Schenectady, after many years in the Motor Division. He is a graduate electrical engineer, Syracuse University, Class of 1923.

DIESEL PROGRESS Editorial Index

A COMPLETE index of all editorial material which appeared in the 1944 issues of DIESEL PROGRESS is now available. Included is a cross index of authors and articles. Feature articles are covered by title; news notes are indexed by names of manufacturers. No charge for this index. Address requests to DIESEL PROGRESS, 2 West 45th Street, New York 19.

Jay B. Chambers Purchases Cummins Diesel Sales of Colorado Dealership

SALE of the Denver dealer franchise for Cummins Diesel Engines, effective April 1, 1945, to Jay B. Chambers, Cummins Regional Manager in the Mid-Continent Area since 1935, has been announced by the Cummins Engine Company, Inc., Columbus, Indiana.



Jay B. Chambers

Since 1942, the Denver dealership has been owned and operated by the manufacturer under the name of Cummins Diesel Sales of Colorado, Inc. With the sale of the property to Mr. Chambers, the organization will be known as Cummins Diesel Sales of Colorado Company. Under the new ownership, the sales and service organization will continue to occupy its present modern quarters at 2501 Champa Street, Denver, which include a large and completely equipped shop, a special fuel pump department and a well-stocked parts department.

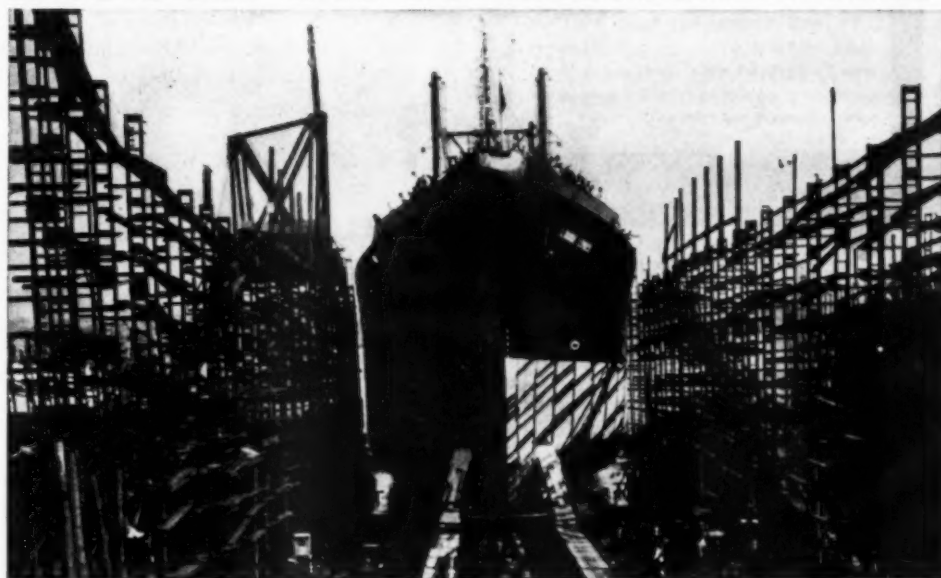


Get to know this button.

Worthington Appoints Harry A. Feldbush

HARRY A. FELDBUSH, formerly Works Manager of the Holyoke, Mass. plant of Worthington Pump and Machinery Corporation has been named Vice President in charge of Engineering for the entire corporation. His duties cover engineering activities of all works and domestic subsidiary companies. His headquarters will be at the general offices in Harrison, N. J. Ralph M. Watson, formerly chief engineer of the Centrifugal Engineering Division has been appointed Assistant to Mr. Feldbush.

ENOUGH OIL TO LAUNCH A SHIP



(Official U. S. Navy Photograph)

Cleaned Daily By MICHIANA OIL FILTERS

All over the world, every day, on gasoline and diesel engines, MICHIANA Filters are saving years of engine life through efficient, sure oil cleaning. Even on engines of average size, barrels of oil are handled daily—dirt and grit extracted, asphaltene and other foreign particles removed thoroughly, consistently. Premature wear is prevented and oil costs are cut.

When MICHIANA Filters are used, dirt passes into the filtering medium and is trapped. Then the oil penetrates throughout the entire depth of the filter element, passing radially from the outer shell to the center. Cleaned oil is returned through center outlet tube to the engine. Experience has demonstrated that when MICHIANA Filters are used, time and cost of engine maintenance are reduced and engine life increased. MICHIANA PRODUCTS CORPORATION, Michigan City, Indiana.



Typical MICHIANA Oil Filters—easily serviced anywhere either with Replaceable Cartridge Element or furnished with Replaceable Type Element.

Send today for new illustrated Bulletin 45-D.



MICHIANA OIL FILTERS

as Motor
Company,
d by Ivor

PROGRESS

MANZEL
FORCE FEED
LUBRICATORS
for Most Efficient Diesel Lubrication



You can't compromise with quality in a Diesel engine lubrication system. That's the reason so many leading Diesel manufacturers install Manzel Lubricators as standard equipment. Manzels are accurate, dependable and economical.

Write for catalog 94-B

MANZEL BROTHERS CO.
275-277 HARBOR STREET BUFFALO, N. Y.

SPACE SAVER!
POWER LIGHT WATER AIR
All In One Compact Package!



MODEL CD Diesel-Marine Auxiliary Unit

ENGINE—5 h.p.
GENERATOR—3½ or 5 kw.
AIR COMPRESSOR—11 or 20 c.f.m.
PUMP—60 or 90 p.p.m. at 60 psi
Net Weight—1,400 to 2,400 lbs., depending upon capacities.
Other combinations to 10 kw. and Diesel-Generator sets available.

WRITE FOR BULLETIN 151

LISTER-BLACKSTONE, INC.
1704 AUSTIN RD. SPRING MILWAUKEE, WISCONSIN, U. S. A.

Pierce Governors

Standard Equipment on the world's leading Diesel Engines!

THE PIERCE GOVERNOR COMPANY, INC.
1603 OHIO AVE., ANDERSON, INDIANA

Koven Official New President of Purchasing Agents Association

HAROLD W. MACINTOSH, of L. O. Koven & Bro., Inc., was elected president of the Purchasing Agents Association of New York at the Annual Meeting held in the Builders' Exchange Club, New York, Tuesday, June 19. He succeeds Millard W. Merrill, purchasing agent of the United States Metals Refining Company.

WEST COAST DIESEL NEWS By JIM MEDFORD

EASILY converted for tuna fishing, the Harbor Boat Building Co., Terminal Island, California, have launched a Navy YP with retraction for 300 tons of food. Main engine is a 560 hp. Union Diesel turning through a Westinghouse Micarta stove-type stern bearing.

LAUNCHED at the Kirkland Marine Construction, Kirkland, Washington, the 74-ft. seiner *Voyager* for unnamed owners is powered with a 350 hp. Atlas Imperial marine Diesel.

BUILT by the North American Shipbuilding Co., Newport Harbor, California, for San Diego owners, the 55-ft. *Trogan*, short-range fisherman, is propelled by a Caterpillar 125 hp. marine Diesel with a General Motors auxiliary Diesel.


A 70-FT. combination tuna and drag boat has been completed by the Seth Greene Machine Works, Seattle, Washington, from designs of Naval Architect Don Hansen, with a 155 hp. Atlas Diesel.

FORMERLY a steam-powered Seattle, Washington, fireboat, the 90-ft. *Snoqualmie* has been purchased by the Dahl Transportation Co., for the Puget Sound-Alaska freight run, and will be repowered with a 210 hp. Fairbanks-Morse marine Diesel.

Stop ALL Leaks

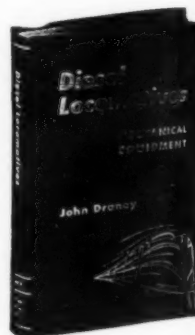
FOR TOTAL VICTORY

SERVING THE UNITED NATIONS WITH DEPENDABLE GASKETS FOR EVERY APPLICATION



DETROIT GASKET & MFG. CO.
DETROIT 23, MICH.

RAILWAY LOCOMOTIVE ENGINEER ADVISES DIESEL



Just Published

The First Books of their Kind.

A practical guide to the operation and maintenance of

RAILWAY DIESEL LOCOMOTIVES

By **JOHN DRANEY**,

Past President, United Association of Railroad Veterans

In collaboration with Diesel technicians from American Locomotive Co.; Baldwin Locomotive Works; Electromotive Division of General Motors Corp.; General Electric Co.; Westinghouse Electric & Mfg. Co.; and many others.

—Interesting Table of Contents—

MECHANICAL EQUIPMENT.

Characteristics of Engine Cycles—Combustion Principles in Modern Diesels—Combustion in High-Speed Diesels—Fuel-Injection, Nozzles—Fuel-Injection Pumps—Lubrication and Cooling Systems—Governors—Supercharging and Turbo-Charging—Air Filtration—Caterpillar Diesel—Cummins Diesel—Hercules Diesel—Cooper-Bessemer Diesel—American Locomotive (McIntosh & Seymour)—Baldwin Locomotive Diesel (De la Vergne)—General Motors Diesel-Electro-Motive Division—Fairbanks Morse High-Speed Diesel—Description and Operation of Mechanical Equipment—Maintenance Instructions—Trucks—Auxiliary Equipment—Vapor-Clarkson Steam Generator Units.

472 pages, 220 illustrations, \$4.00

ELECTRICAL EQUIPMENT

Current Electricity—Principles of a Generator—Ohm's Law—Electrical Power Measurements—Transmission Equipment—GE Light Weight Diesel Locomotive—BW Equipment for Switching Locomotives—Electro-Motive Equipment—Alco-Ge 680 HP. and 1000 HP. Diesel Electric Locomotives—Alco G-E Diesel-Electric Road Locomotive 2000 Hp. Equipment.

388 pages, 235 illustrations, \$3.75

Both \$7.50 postpaid

Order from

DIESEL PROGRESS

2 West 45th St. New York 19, N. Y.

AN 840 hp. supercharged with Elliott-Buchi exhaust turbine Union Diesel has been selected as power for the new 140-ft. tuna clipper *Navigators* building by Campbell Machine Co., San Diego, California, for combination interests.

THOMPSON Machine Works, San Francisco, California, reports sales of Gray marine Diesels to Burt Erickson, San Bruno, an 82 hp., and to N. M. Alling, Sacramento, both with Twin Disc gears.

ENGINE with a 250 hp. Cooper-Bessemer marine Diesel, the Peterson Boatbuilding Co., Tacoma, Washington, have built a 75-ft. tuna clipper that will have auxiliary Diesels by Chrysler, and pumps and motors by Fairbanks-Morse.

APPOINTED Gray Diesel engine distributor for Washington and Alaska, the Jules Engine and Equipment Co., Seattle, Washington, is headed by S. O. "Ted" Jules, former West Coast supervisor for the Gray Marine Motor Co., Detroit, Mich.

REPORTED to be the largest dragger on the West Coast, Captain Spiro Babich's 90-ft. *Liberator*, built by a Seattle, Washington yard, is powered with an Elliot-Buchi turbocharged Enterprise 600 hp. marine Diesel.

POWERED with a Cummins marine Diesel of 150 hp., Victor Candia's new combination fishing boat *Seal*, San Francisco, California, makes ten knots with full fish wells.

SAID to be the first West Coast fishing vessel to install a factory built General Motors, twin-Diesel, dual-drive to single shaft, the 76-ft. herring boat *Marhild* is building by Barbee Marine Ways, Seattle, Washington, for Anderson & Soback.

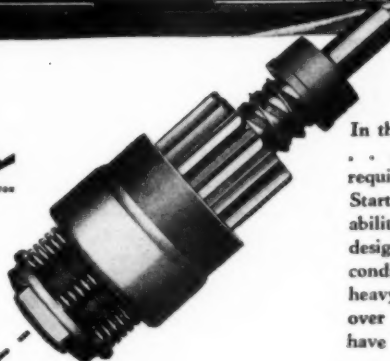
THE Enterprise Engine & Foundry Co., San Francisco, California, announce the appointment of C. S. Herbert as executive vice-president, at the same time retaining his position as secretary-treasurer. He will have charge of Diesel engine sales.

ALL-ATLAS Imperial Diesel engine, the new 105-ft. clipper *Sea Hound* by Al Larson, Terminal Island, California, for Van Camp Sea Food Co., the main engine is of 400 hp., the auxiliaries, 120 hp. with G.E. generators and U. S. motors.

... And now please turn to page 131 ...



It all starts with Bendix



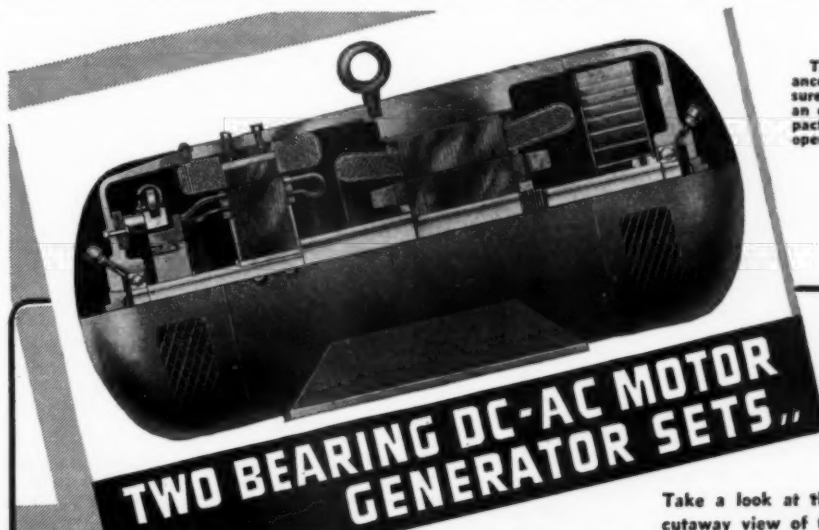
**The Drive for
Heavy-Duty Starting**

In the forests . . . on the farms . . . in the oil fields . . . wherever heavy-duty industrial machinery requires starting under severe conditions, Bendix* Starter Drives have a remarkable record of dependability. These Heavy-Duty Drives are specifically designed and engineered to meet the most rugged conditions of work and weather. If you have a heavy-duty starting problem, better buy Bendix—over sixty-five million Bendix Drives of all types have been installed—proof positive of their value!

*TRADEMARK

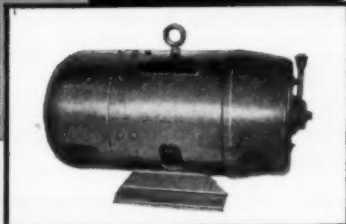
Bendix Drive

ECLIPSE MACHINE DIVISION
BENDIX AVIATION CORPORATION
ELMIRA, NEW YORK



**TWO BEARING DC-AC MOTOR
GENERATOR SETS**

The well-balanced design assures the user of an efficient, compact, and smooth operating unit.



Complete engineering data upon request. Special designs to meet your particular requirements.



Take a look at the above cutaway view of the Kurz and Root squirrel cage motor and DC generator armature mounted on a solid shaft, supported at each end by oversized ball bearings. Note, both motor and generator field are mounted in an integral rolled steel frame. This single frame unit is proving of value in many industrial plants. Can be provided with electric speed governors mounted at the end of the shaft. Maximum output is assured by providing ample cooling through the center section of the frame.

KURZ and ROOT Company

APPLETON - WISCONSIN

... and 20 motor and motor generator sets

OAKITE SHORT CUTS FOR Diesel OPERATORS

Low Cost Way To Clean Your Oil Preheaters

Fuel oil heaters and coolers . . . these and similar types of heat exchangers can be quickly freed of insulating sludge and scale by using modern Oakite techniques specifically engineered for the job.

Thoroughly removing excessive build up of sludge and carbon on the oil side, scale and other hard deposits on the water side the widely-recommended Oakite method helps restore maximum operating efficiency.

Interesting 20-page instructional digest fully covers the low-cost Oakite maintenance cleaning task . . . discusses many others as well. Write for your FREE copy today.

OAKITE PRODUCTS, INC.
222 Thames Street, New York 6, N.Y.

Technical Service Representatives Located in All
Principal Cities of the United States and Canada

OAKITE
Specialized CLEANING

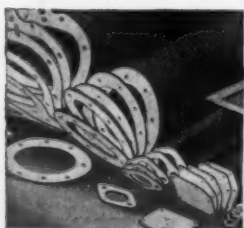
How Thousands of Gasket Improvements are being effected by Fel-Pro Developments in Thiokolized Gaskets

For that New Design . . . or Re-Design! Investigate the 2 BIG ADVANTAGES of Fel-Pro's Pioneering Development and Production of Thiokolized and other specially treated Gasket Materials.

Through Thiokolizing and other treatments of such gasket materials as Felpak, Karopak, Fishpaper, Chipboard, Fibre, Cork and others . . . a host of new, improved gaskets are being produced for thousands of America's leading manufacturers.

Most of these were developed originally to meet a specification . . . a car builder needed a more durable, oil resisting gasket . . . an electrical device maker, similar material with high insulating and sealing qualities . . . an auto accessory maker, an oil resisting gasket with tremendously high tensile strength . . . etc.

Fel-Pro has the Know-How to provide the proper gaskets for your requirements and the PRODUCTION KNOW-HOW to produce them ECONOMICALLY and to highest quality standards. Write Today for FREE PORTFOLIO OF LATEST SEALING MATERIALS and further details of our NO CHARGE CONSULTATION SERVICES.



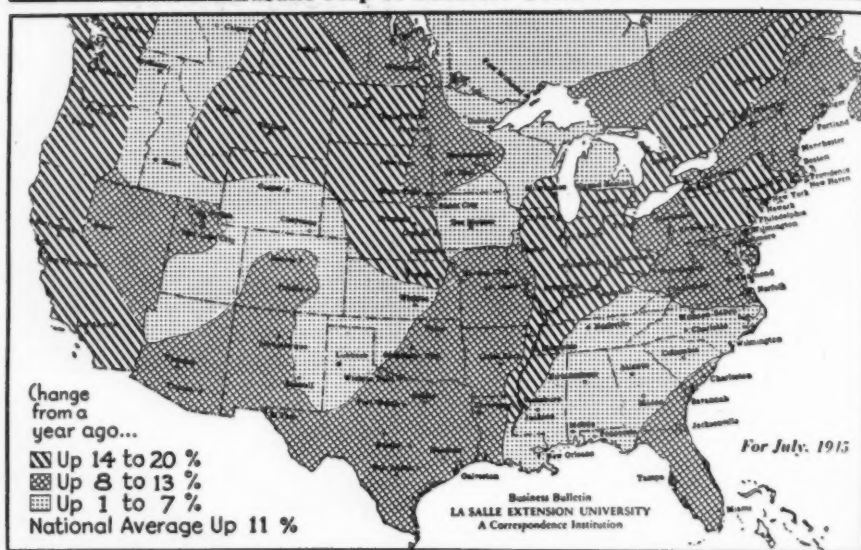
1190

FEL-PRO PRODUCTS MFG. CO., 1522 CARROLL AVE., CHICAGO, ILL.

FEL-PRO

with Sealing Materials,
Gaskets, Packing, Sound
and Vibration Dampeners,
Washers, specially die-cut,
treated and fabricated by

LaSalle Map of Business Conditions



Areas of Good Business Shifting Westward

Map Supplied by BUSINESS BULLETIN DIVISION of La Salle

The rate of business activity has changed very little during recent weeks as the small decline in manufacturing has been offset by increases in trade and transportation. Activity in many of the service industries has also been rising slightly. Indications are that the high point in the moderate upturn of the last few months has been passed and the future trend is likely to be gradually downward. The decline will not be sharp, however, as business will be sustained by continued large war expenditures and by high consumer incomes.

The total volume of trade and industry, as measured by financial transactions, now averages about 11 per cent higher than it was last year at this time. The difference between the rates during the corresponding months of the two years will probably become gradually less during the summer but by fall the reconversion of many industries to civilian production will help keep up the volume of business.

Unfavorable weather conditions throughout the spring and early summer have slowed down activity in many agricultural regions. The effects have been most striking in the Southeast where crops have suffered from lack of moisture and in part of the Middle West where the excessive rain and cold weather have handicapped farmers.

The most striking current trend is the shifting of the areas of good business westward, due mainly to the increasing demands of the war in the Pacific. That trend will probably become even marked within a few weeks and it will continue indefinitely. Many areas in the East are already showing considerable fall-off as compared with last year, but everywhere conditions are far above the average of prewar years.

The main area of good business in the East is around New York city. The large volume of ship-

ments abroad as well as spending in connection with transportation of troops are factors in sustained business in that region. Business is good around the Great Lakes and to a considerable distance south. War orders are still large in that area and the demand will keep up industrial production in most of the factories.

Conditions have become unusually varied throughout the South. In the eastern half business has been lagging while in the western half it has been holding steady at about the same rate as the national average. It is good in the oil producing regions and if the winter wheat crop is as large as now indicated it should be better in many other places. It is lagging somewhat in the mountain regions, where mining has been gradually falling off from the previous high levels.

Throughout the Pacific Coast region, business has been holding up much better than in most other parts of the country. In many cities the volume of trade is from 15 to 20 per cent higher than it was a year ago. The most significant industries in which operations are being maintained are airplane manufacturing and shipbuilding. The repairing of ships is requiring more workers while not so many are being employed in new construction.

Canadian industrial activity is holding up well although the trend is gradually downward. It is about 10 per cent above last year as the drop in industrial production has been offset by increases in other lines. The best showing continues to be made in the area north of the Great Lakes. Business in the agricultural regions has been somewhat slowed down by the unfavorable weather but prospects are now improving. Large consumer incomes, spending for war purposes, and the large volume of foreign trade will help keep general business activity high during the summer.

DIESELS

ALL SIZES TYPES

A. G. SCHOONMAKER CO.
30 CHURCH ST. PHONE WORTH 2-0455
NEW YORK 7, N. Y.
BUSINESS ESTABLISHED 1898

PETROMETER

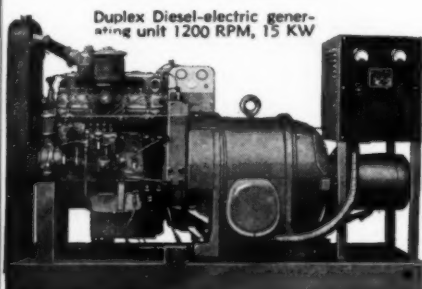
FOR TANK GAUGING EQUIPMENT FOR
DAY TANKS & CLEAN OIL STORAGE
PETROMETER CORPORATION
1 STAR SQUARE, LONG ISLAND CITY, N. Y.

Generating Units

5 K.W. to 100 K.W. A-C or D.C.

Close regulation of voltage and frequency is an outstanding feature of the generating units we build with either Diesel or gasoline prime movers. We are also equipped to supply any type of instrument panel required.

Manufacturers of engine generator sets for over 20 years.



Duplex Diesel-electric generating unit 1200 RPM, 15 KW

Duplex Truck Co.
Lansing, Michigan

The Modern

GAS TURBINE

By R. TOM SAWYER, M.E., E.E.,
Engineer, Diesel equipment, American Locomotive Company; Chairman, Co-ordinating Committee on Gas Turbines of A.S.M.E.

Its Uses as an Exhaust Turbo-supercharger or Prime Mover in All Fields of Service, including JET PROPULSION

Just published, this new work brings together in one compact volume a great wealth of authoritative information on the gas turbine. It traces the history of this power device from its earliest inception down to its latest applications in all fields of service on land, on sea, and in the air. Briefly, here are some of the principal topics covered in the 10 chapters:

- Construction and operation of the modern gas turbine
- advantages of the gas turbine as a supercharger
- history of inventions in the field
- how turbocharging increases engine power
- efficiency of the internal combustion turbine and factors in performance; mechanical aspects
- use of gas turbines in industry, diesel electric locomotive, marine service
- use of turbosuperchargers in the aircraft engine
- operation of the jet propelled plane

PROFUSELY ILLUSTRATED! Author has included 131 line drawings, halftones, blueprints of various types of gas turbines, charts, graphs, and tables.
216 Pages 6 x 9 Inches \$4.00

Mail Your Order Today To

DIESEL PROGRESS

2 WEST 45th ST., NEW YORK 19, N. Y.

West Coast: Cont'd. from page 129

BUILT by George Jacobson, Seattle, Washington, for Erick Johnson, the 45-ft. salmon boat *Hike II* is powered with a 65 hp. Caterpillar marine Diesel.

RETURNED by the government and sold to Sal Ferrante of Monterey, California, the newly named *Rosanna* (ex-Dante Alighieri) is getting a new 240 hp. Fairbanks-Morse at the George W. Kneass plant, San Francisco.

OWNED by Matteo LaGrande, the 45-ft. fish boat *Felicia II* built by San Pedro Boat Works, Terminal Island, California, is powered with a 60 hp. Caterpillar marine Diesel and Joes gears.

BUILT by the Western Boat Building Co., Tacoma, Washington, Captain Anton's new 96-ft. purse-seiner is powered with a 400 hp. Enterprise marine Diesel.

RECONDITIONED at a cost of \$100,000, the 99-ft. *Lusitania*, by Lynch yards, San Diego, California, gets a Caterpillar Diesel auxiliary and F-M pumps.

WATER Transport, a branch of the Canadian Army Service Corps, has commissioned three new 95-ft. supply vessels each powered with 500 hp. Atlas Diesel engines and built by Victor Motor Boat Co., Vancouver, B. C.

ON the far south end of the coast, another vessel gets an Atlas marine Diesel—the 62-ft. clipper *Clara Marie* by North American yard, for a group of San Diego fishermen. The engine is of 155 hp., and there's a 60 hp. Caterpillar marine Diesel auxiliary.

BUILT by Calkins at Newport, Oregon, for Dudley Rowe of same place, the combination fish boat of 42 feet will have a Cummins 100 hp. Diesel.

PLYING between the Oregon mainland and Sauvie Island, the double-ended ferryboat *Multnomah* owned by Multnomah county has a 75 hp. Caterpillar Diesel that drives her across the 800 ft. Willamette River.

**CRACKED HEADS WELDED
• ENGINES REPAIRED**

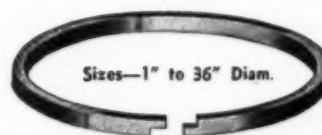
Satisfaction **VALVE SEATS**
Guaranteed **HARD SURFACED**

BRODIE
AN ENGINEERING SERVICE

117 Clifton Pl.
Brooklyn,
New York

For a Long Time **25 YEARS**
AUTO-DIESEL
HAVE BEEN MAKING QUALITY RINGS

Down through the years AUTO-DIESEL "Ladle Tempered" Piston Rings have been used as original equipment and replacement for Diesel powered units of all types—stationary and mobile units and hydraulic and pneumatic operated industrial equipment. Many firms have found them so satisfactory that they are used as standard equipment. The reason for satisfactory performance is that it has always been our policy to make the best ring possible—to make a QUALITY product.



Sizes—1" to 36" Diam.

Write for Information

THE AUTO-DIESEL PISTON RING CO.
3151 SUPERIOR AVE. CLEVELAND 14, OHIO

QUALITY RINGS SINCE 1921

"NORMA-HOFFMANN"



PRECISION BEARINGS

FOR EVERY LOAD,
SPEED, AND DUTY
108 DISTINCT SERIES
OVER 3000 SIZES
BALL, ROLLER AND THRUST

1 1/2" to 22 1/2" Bore in Metric and Inch Sizes
Write for the Complete and
Illustrated Catalog
NORMA-HOFFMANN
BEARINGS CORP., STAMFORD, CONN.
FOUNDED 1911

SEAMLEX

THE

FLEXIBLE • SEAMLESS • ALL-METAL HOSE



DIESEL
ENGINE
EXHAUST
TUBING

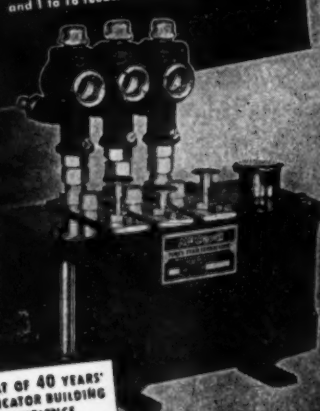
FOR STEAM • WATER • OIL • CHEMICALS
GAS • AIR • ETC. Literature on Request

SEAMLEX COMPANY, INC.

27-22 Jackson Avenue, Long Island City 1, N. Y.

MCCORD
Class S.F.
LUBRICATORS

A modern lubricator for modern service on Diesel, gas, steam engines and compressors. Supplies dependable cylinder lubrication in metered quantities reducing friction and wear. Capacities: 2 to 34 pt. and 1 to 16 feeds. New catalog on request.



RESULT OF 40 YEARS' LUBRICATOR BUILDING EXPERIENCE

MCCORD RADIATOR & MFG. CO.
DETROIT, MICHIGAN
LUBRICATOR DIVISION

**Highest Quality
Gaskets & Oil Seals**
by **FITZGERALD**
Gasket Craftsmen
for 39 Years

Gaskets of all types and materials to give reliable service under all Diesel operating conditions.

For full information write —

**THE FITZGERALD MANUFACTURING
COMPANY**

TORRINGTON, CONN.

Branches: Chicago, Illinois, Los Angeles, California
Canadian FITZGERALD, Limited, Toronto

FITZGERALD
SINCE 1906
GASKETS
THE COMPLETE LINE OF DIESEL GASKETS

Latest Diesel Patents

A description of the outstanding patented inventions on Diesel and Diesel accessories as they are granted by the United States Patent Office. This information will be found a handy reference for inventors, engineers, designers and production men in establishing the dates of record, as well as describing the important Diesel inventions.

Conducted by C. CALVERT HINES

2,322,356

INJECTION PUMP

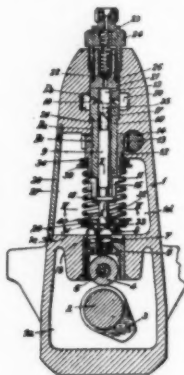
Erwin Hahn, Arbon, Switzerland, assignor to Aktiengesellschaft Adolph Saurer, Arbon, Switzerland

Application May 6, 1941, Serial No. 392,142

In Germany May 7, 1940

2 Claims. (Cl. 103-41)

1. An injection pump comprising a single piece casing formed with a bore, a pump cylinder removably inserted in said bore, a pump plunger reciprocable in said cylinder, said casing being provided with a chamber having a lateral opening, a plunger retracting spring disposed in said chamber and detachably connected with said plunger, said spring connection in-



cluding an abutment shoulder on the plunger, a radially slotted disc loosely engaged on the plunger and resting on said shoulder, an annular spring cup carried by said disc to support one end of said retracting spring, and a spring cup supporting the other end of the retracting spring, said two spring cups having annular rim portions whereby an auxiliary sleeve member may be inserted through said lateral opening to engage the rim portions of said spring cups and relieve the plunger from spring pressure to permit removal of said slotted disc engaged on the plunger and withdrawal of said plunger and pump cylinder from said bore in the pump casing.

2,317,253

DIESEL ELECTRIC DRIVE AND CONTROL SYSTEM

Stuart H. Cowin, Chicago, Ill., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Application March 13, 1940, Serial No. 323,755

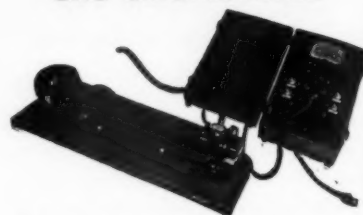
4 Claims. (Cl. 177-311)

1. In a vehicle, a prime mover generator power plant, output regulating means therefore, traction motors for driving the vehicle, electrical connections between the generator and the

DIESELS

ROBERT SCHOONMAKER
Port Washington, Long Island, N.Y.
Phone Roslyn 1220

Photoelectric CRC SMOKEMETER



Objective indication of smoke density, independently of human judgment and of light conditions.

Approved by the Coordinating Fuel Research Committee. Manufactured by

PHOTOVOLT CORP.

95 Madison Ave. New York 16, N. Y.
Write for Literature

• IF THE FORGING IS HEAVY
DUTY IT SHOULD BE
NATIONAL FORGED

NATIONAL FORGE & ORDNANCE CO.

IRVINE, WARREN COUNTY, PENNA.

"We Make Our Own Steel"

GRAYMARINE DIESELS

Since Pearl Harbor, engines bearing this nameplate have totalled over 50,000 units, better than eleven million horsepower, representing close to one fourth of the total propulsive horsepower installed by the U. S. Navy during the war. We have shipped them to 41 American Boat Yards, and to 55 other destinations.

The record of these engines in peacetime and in war reflects the competence of Gray in the marine field. The building and marketing of engines bearing this trademark is a continuous and continuing development, a piling-up of experience which gives fulfillment to improvement and progress, results always in better engines for the industry.

GRAY MARINE MOTOR COMPANY
Pioneers • Engineers • Leaders
DETROIT, ZONE 7, MICHIGAN

PANISH CONTROL MEANS FOOLPROOF CONTROL

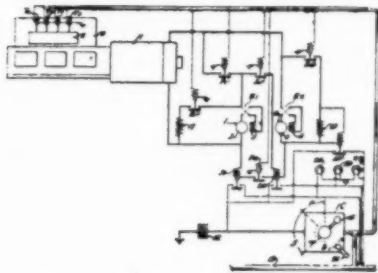


Finger Tip REMOTE CONTROL

Instantaneous, foolproof, single lever operation of both reverse gear and throttle. Battle-tested and battle-proven to be the most outstanding and reliable remote control system made.

PANISH CONTROLS
BRIDGEPORT 5, CONNECTICUT

motors, separate overload current responsive means for the generator and for the motors, contactors for connecting the motors and the



motor overload current responsive means in series relation with the generator or for also connecting the motors in parallel relation with the generator and for simultaneously connecting said generator overload current responsive means in series between the generator and one motor, separate alarm means operatively connected with each overload responsive means, and a manually operable controller for jointly and selectively controlling said power plant output regulating means and said contactors, said controller being selectively movable to any one of a plurality of control positions in each of two ranges to control the output of the power plant to a preselected value, one range of controller movement controlling the contactors for establishing the series motor circuit relation with the power plant generator and the other range of controller movement controlling the contactors for establishing the parallel motor circuit relation with the power plant generator.

2,326,171

FUEL INJECTION DEVICE

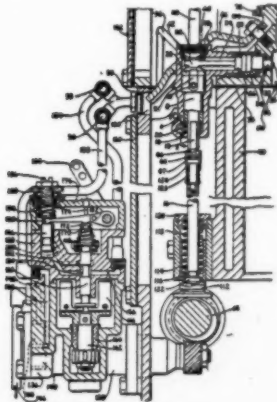
Ferdinando Carlo Reggio, Detroit, Mich.

Application August 17, 1940,

Serial No. 353,002

16 Claims. (Cl. 123-139)

1. In combination with an internal combustion engine including a cylinder block having a machined surface, a detachable fuel injector including an injection nozzle and a plunger pump having their axes substantially at right angles; a gasket at the end of said nozzle; flange



means for said injector whereby the latter may be clamped on said surface with the axis of said pump perpendicular thereto; a fuel inlet and a fuel return outlet in said injector; fuel lines having their ends adapted to be detachably connected with said inlet and said outlet; and attaching means for clamping said ends of said lines on said inlet and said return outlet thereby transmitting to said injector a load which is resolved into two component loads substantially in line with said two axes for clamping said flange means against said machined surface, and for applying sealing pressure to said gasket.

**WHEN YOU NEED
PRECISION-BUILT
SMALL PUMPS... Specify TUTHILL**



FOR COOLANT SERVICE

IT'S MODEL M

with built-in automatic by-pass

Chips and grit don't phase this internal-gear rotary pump. Its built-in automatic by-pass allows small particles to pass through without serious injury to working parts. Precision-built for long, dependable service Model M provides capacities from 1 to 50 g.p.m. Available in stripped form for direct incorporation into the design of the machine. Write for Model M bulletin.

TUTHILL PUMPS
ARE SERVING
ARMY • NAVY
AIR FORCE
MERCHANT
MARINE

TUTHILL Pump Company
939 EAST 95TH STREET
CHICAGO 19, ILLINOIS

**CHECK
YOUR FUEL
SUPPLY
AT A
GLANCE**



Write for Bulletin

THE LIQUIDOMETER CORP.

38-24 34th Avenue, Long Island City, N.Y.

The Experience Resulting
from 83 Years Devoted
Exclusively to the Design
and Application of
Both Plain Mechanical
and Hydraulic Types of
Governors
Is Available When You
**SPECIFY
PICKERING
FOR YOUR ENGINES**

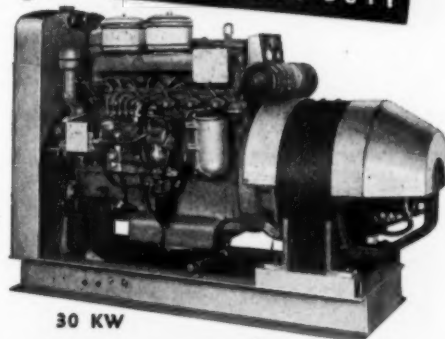
PORTLAND



CONN.

ELECTRICITY

for **STAND-BY SERVICE
OR
CONTINUOUS DUTY**



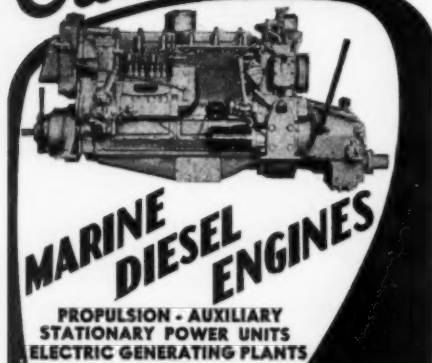
30 KW

U. S. MOTORS CORP.

542 Nebraska Street
OSHKOSH, WISCONSIN

U.S. DIESEL ELECTRIC PLANTS

"Caterpillar"



MARINE DIESEL ENGINES

PROPULSION - AUXILIARY
STATIONARY POWER UNITS
ELECTRIC GENERATING PLANTS

H.O. PENN MACHINERY CO.

INCORPORATED
140th STREET & EAST RIVER, NEW YORK 54, N. Y.

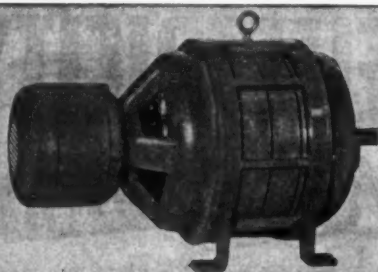
BRANCHES
MINEOLA, LONG ISLAND, POUGHKEEPSIE, N. Y.
NEWINGTON, CONNECTICUT.

MILWAUKEE OIL RE-REFINING EQUIPMENT

(VACUUM PROCESS)
For Marine & Stationary
Internal Combustion Engines

HOLCOMB ENGINEERING COMPANY

77-35 113th STREET
FOREST HILLS • NEW YORK



Columbia A.C. and D.C. Generators are built to meet highest performance standards. Complete range of application, including light, power, ship auxiliaries, or custom designed units.

D.C. UNITS range from 7½ to 200 KW.
A.C. UNITS range from 6¼ to 300 KVA.
Speeds and other specifications to meet requirements. Write for full information.

COLUMBIA ELECTRIC MFG. CO.
4819 Hamilton Ave., N.E., Cleveland 14, Ohio

COLUMBIA GENERATORS

A.C. and D.C.

ADVERTISERS' INDEX

Aerofin Corporation	96	Ladish Drop Forge Co.	103
Aircraft & Diesel Equipment Corp.	88	Lanova Corporation	50
Aluminum Co. of America	109	Lawson Machine & Tool Co.	40
American Air Filter Co., Inc.	86	Leece-Neville Co., The	11
American Bearing Corp.	10	Liquidometer Corp., The	133
American Bosch Corp.	18-19	Lister-Blackstone, The	128
American Locomotive Co.	44-45		
American Tube Bending Co.	113	McCord Corporation	132
Auto-Diesel Piston Ring Co., The	131	McQuay-Norris Mfg. Co.	101
		Manzel Bros. Co.	128
Baldwin Locomotive Works, The	95	Marine Products Co.	28
Borg-Warner Corp.	39	Marquette Metal Products Co.	31
Briggs Clarifier Co.	90	Maxim Silencer Co., The	7
Brodie System, Inc.	131	Michiana Products Corp.	127
Buckeye Machine Co.	112	Murray & Tregurtha, Inc.	36
Buda Co., The	17		
Bunting Brass & Bronze Co., The	46	National Bearing Metals Corp.	91
Burke Electric Co.	117	National Forge & Ordnance Co.	132
		National Jet Company	106
Campbell, Wyant & Cannon Foundry Co.	33	National Supply Co., The	9
Candler-Hill Corp.	20	Nordberg Mfg. Co.	41
Chicago Screw Co., The	116	Norma-Hoffmann Bearings Corp.	131
Cleveland Diesel Engine Div., General Motors Corp.	68-69		
Columbia Electric Mfg. Co.	134	Oakite Products, Inc.	130
Commercial Iron Works	121	Ohio Crankshaft Co., The	24
Commercial Research Laboratories, Inc.	123		
Consolidated Shipbuilding Corp.	34	Panish Controls	133
Cooper-Bessemer Corp.	Fourth Cover	Parker Appliance Co., The	35
Cummins Engine Co.	29	Pedrick Piston Rings	26
		Penn Electric Switch Co.	22
Delco Products Div.	14	Penn Machinery Co., Inc., H. O.	134
DeLuxe Products Corp., The	16	Petroleum Solvents Corp.	124
Detroit Diesel Engine Div., General Motors Corp.	104-105	Petrometer Corp.	130
Detroit Gasket & Mfg. Co.	128	Photovolt Corp.	132
Diesel Engineering & Mfg. Corp.	23	Pickering Governor Co., The	133
Dollinger Corporation	30	Pierce Governor Co., The	128
Duplex Truck Co.	131		
Durabla Mfg. Co.	5	Roots-Connersville Blower Corp.	126
		Ross Heater & Mfg. Co.	102
Eclipse Machine Div., Bendix Aviation Corp.	129		
Electric Auto-Lite Co., The	83	Saginaw Malleable Iron Div.	15
Electric Machinery Mfg. Co.	111	Schoonmaker Co., A. G.	130
Elliott Company	Third Cover	Schoonmaker, Robert	132
Enterprise Engine & Foundry Co.	12	Scintilla Magneto Div., Bendix Aviation Corp.	51
Erie Forge Company	125	Sealed Power Corp.	87
Ex-Cell-O Corporation	8	Seamlex Company, Inc.	131
		Shell Oil Co., Inc.	54-55
Fairbanks, Morse & Co.	2-3	Sims Company, The	126
Farrel-Birmingham Co., Inc.	42	Sinclair Refining Co.	89
Federal-Mogul Corp.	6	Socony-Vacuum Oil Co., Inc.	13
Felt Products Mfg. Co.	130	Sperry Gyroscope Co., Inc.	91
Fitzgerald Mfg. Co.	132	Sperry Products, Inc.	49
Fluor Corporation, Ltd., The	32	Star Electric Motor Co.	1
Fulton Iron Works Co.	120	Sterling Engine Co.	25
		Sun Oil Company	52
General Machinery Corp.	38		
General Motors Corp., Cleveland Diesel Engine Div.	68-69	Texas Co., The	Second Cover
Detroit Diesel Engine Div.	104-105	Tuthill Pump Co.	133
Globe-Union, Inc.	122		
Goetze Gasket & Packing Co., Inc.	99	United States Gauge Co.	4
Gray Marine Motor Co.	132	U. S. Motors Corp.	133
Gulf Oil Corp.	47		
		Van Der Horst Corp. of America	48
Hall Mfg. Co., The	100	Van Dorn Iron Works Co., The	107
Harrison Radiator Div., General Motors Corp.	27	Victor Mfg. & Gasket Co.	37
Hendy Iron Works, Joshua	119		
Holcomb Engineering Co.	134	Walworth Co.	108
		Wausau Motor Parts Co.	98
Illinois Testing Laboratories, Inc.	92	Weatherhead Company, The	85
		Westinghouse Electric Corporation	94
Koppers Company, American Hammered Piston Ring Div.	43	Weston Electrical Instrument Corp.	1
Korfund Company	118	Wilkening Mfg. Co.	26
Kurz & Root Co.	129	Worthington Pump & Machinery Corp.	97
		Young Radiator Co.	29